RAILROAD GAZETTE

FRIDAY, MAY 4, 1900.

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Contributions.

Burning Soft Coal Without Smoke.

Canadian Pacific Railway Company,
Montreal, April 30, 1900.

To the Editor of the Railroad Gazette:

I have read with interest the article in your issue of April 27 on the burning of bituminous coal without smoke on the Southern Pacific System, and after having carefully read the subject matter over and examined the illustrations I have to confess that I do not see anything that has not been tried on this road, and the results as regards burning smoke have been practically nothing. In other words, we have not succeeded in burning smoke from what is properly so called a smoking coal. The most of the arrangements shown were tried from six to ten years ago.

R. ATKINSON,
Supt. Rolling Stock.

State Ownership of Railroads.

Philadelphia, April 24, 1900.

To the Editor of the Railroad Gazette:

I have read the engaging essay on State ownership of railroads, by Dr. E. W. Bemis, which you abstract in your issue of April 20, page 258. As Dr. Bemis bases his arguments largely on what the State could do [if its legislators and executive officers should happen to act with unerring and uniform wisdom] rather than on the probabilities as judged by past experience, it is perhaps not worth while at this time to make a thorough examination of his claims; but there was another academic essay that figured in the Massachusetts legislative campaign, which you have not mentioned. It is a paper by Prof. John R. Commons, a fellow-student of Prof. Bemis; in this there is a fundamental fallacy which ought to be exposed.

Prof. Commons begins by describing the different kinds of discrimination and calls attention to the fact that shippers who receive special rates on the Boston & Albany not only pay an average of 60 per cent. less than the tariff rates, but also keep all their contracts secret. No shipper knows what reductions other shippers are receiving. Prof. Commons argues that the Massachusetts law, like that of the General Government, ought to require all rates to be made public, but further along he admits that it is practically impossible, under private management of railroads, to prevent secret discriminations, and from this he goes on to argue for State ownership. He says that Germany purchased the railroads, not for military reasons but mainly to get rid of discriminations, which had been in force, notwithstanding stringent prohibitory laws (F. Ulrich, in Tarifs des Chemins des Fers, 1890, page 79). Another motive was to support Bismarck's protective tariff; the railroads were giving reductions to importers, thus neutralizing the protective tariff. Now there is no secret discrimination and the roads favor exporters. The Government has notified the trusts, especially the coal trust, that exorbitant charges will be met by low freight rates to remote competitors. Returning to America, Prof. Commons notes that the Massachusetts Commissioners permit cargo rates while the Interstate Commerce Commission prohibits them. He declares that the cargo rate is vicious and the carload rate is questionable, though perhaps the latter may be a convenient compromise between the principle of equality and justice on the one hand and wholesale cost on the other. It might be right for the railroads to argue about the lower cost of the cargo or carload if they were purely private, but the public is a partner in their business. The purpose of the public is to encourage the poor young man, with the hope that he may rise if he displays energy. . . . Discriminations like ours do not exist to any extent in England, France, Italy or Russia. In Australia the rate is the same for all quantities above 400 lbs. In Massachusetts carload rates show great discriminations. On petroleum the rate is 200 per cent. higher for small quantities than for carloads. Prof. Commons says that on some articles there is a discount of 100 per cent. on carloads; but we may charitably suppose that he means 50 per cent.

Without stopping to discuss the ethical question involved in using railroads as a Government instrument to support a protective tariff, I desire merely to call attention to the argument by which this essayist would justify a law forbidding a railroad to make any lower rate on 1,000 tons of coal than on 1,000 lbs. of the same. It is that the young man may have a chance to set up an independent business! If five hundred thousand people in Boston can get their coal for five dollars a ton by having it brought from the mines in large quantities, Prof. Commons would raise the price to $5.10 (more or less) so as to favor the small dealer! What kind of political economy is this? Why not pass a law limiting the size of the vessels which shall bring coal from Perth Amboy or Philadelphia to the Boston wharves? That would be just as reasonable. To speak of "equal rates and justice" as though the two were synonymous, may or may not be correct. In this matter the nearest we can come to defining justice is to call it the greatest good to the greatest number; and, as I have suggested, the best way to accomplish this may be to make so-called unequal freight rates. When trusts oppress the poor it is the duty of the people to compel them to desist; but if there is no way to do this except by making it impossible to do business economically the "masses" will have reason to be the first to object.

S. G. W.

Notes on the Union Pacific.

The Union Pacific is increasing the capacity of its new pressed steel coal cars from 80,000 to 110,000 lbs. by raising the sides and ends. The trucks and framing are considered strong enough for the greater loads and the side boards are attached by chains, and when in use are held in place by stirrups. As these are flat bottom cars which have to be unloaded by shoveling over the sides, the boards are not fixed permanently in place; as arranged, the work of unloading is not increased.

A practice prevailing at the Omaha shops of the Union Pacific on account of the crowded condition of the erecting shop is to strip engines outside and load all the parts on trucks of standard gage. Thus the firebox may be placed on one truck and switched to the boiler shop; other parts may go to another place, while the fittings and all pieces not needed before the engine is erected are loaded together and the truck placed on a siding until required. This keeps the erecting shop clear of miscellaneous parts not immediately needed on the work in hand, and is said to prevent many annoying losses of small pieces.

The shops and shop grounds at Omaha are unusually clean and well kept and this is said to result in practically no extra expense; the effect on the men of an orderly shop is bound to be beneficial, and when it is once thoroughly understood that things must be kept in order it is found that little extra labor is required for cleaning. At the Omaha shops a place is provided for different kinds of scrap and no large pieces are to be seen lying around. Nevertheless there will be small pieces like nuts and broken bolts which will become scattered where repair work is in progress and about once a month it is found to pay to have a man with a wheelbarrow go around the grounds and gather up these odds and ends. Recently at Omaha a $1.25 laborer in one day picked up 1,100 lbs. of little wrought iron pieces, at that time worth $19 a ton. It may be suggested that if this holds for the Omaha shops, a good many master mechanics could clean up their shop grounds and make a handsome profit on the work.

The Union Pacific is now changing the front ends of all its passenger and freight engines and replacing the diamond stacks heretofore used with open stacks lightly tapered. The front end arrangement being applied is that designed some time ago by Mr. J. S. Turner, Superintendent of Motive Power of the Fitchburg R. R., and is self-cleaning and has no cinder pocket. As applied to Union Pacific engines the extension is 16 in. and the front end is found to clean itself satisfactorily. In a recent comparative test of the Turner front end with an open stack and the standard front end and diamond stack of the Union Pacific an appreciable saving of fuel was found with open stack and short extension front and in addition the back pressure in the cylinders was less. An objection to the diamond stack on recent large engines has been raised by enginemen, that there is such a low velocity at the mouth of the stack that the smoke settles about the cab windows and obstructs the view. Diamond stacks will be retained on switch engines.

At the Omaha shops compressed air is much used, probably to as large an extent as in any railroad shop, but a good deal of care is taken that it does not become a fad. Unless the air tools prove to be economical they are discarded for other methods. In this way the use of pneumatic stay bolt cutters has been stopped and this work is said to be more economically done by hand. With the present method two men are required to break the side bolts of fireboxes. After the back head has been removed, a long chisel bar having a notch in the end is held against a bolt by one man while the other strikes the end of the bar with a heavy ram suspended from the roof. This man simply draws back the ram and guides it during the forward stroke, striking a heavy blow with little exertion on his part. The bolts are quickly broken in this way and the cost is enough less to warrant using this arrangement instead of the pneumatic cutter which is not so easily handled.

The Approaches to the New East River Bridge.

The Commissioners of the New East River Bridge have issued specifications and form of contract for building the steel and masonry approaches of the bridge. Bids will be received at the office of the Commissioners, 258 Broadway, New York City, at 2 o'clock p. m. May 31. Copies of the specifications and drawings, etc., may be procured at the office of the Chief Engineer, No. 84 Broadway, Brooklyn.

The contractor must begin the work within 10 days and must finish the New York approach within 15 months after the contract is executed, and the Brooklyn approach within one year. He must give bonds for $400,000 and $200,000 respectively. Bids will be received only from first class establishments having the requisite plant and facilities and which have been in successful operation on work of a similar character for at least one year. The contract is for all the materials and labor of building. The contractor is required to divide his bid into the several items, giving the quantity and price of each.

The work will consist of making and erecting complete in place the steel and masonry approach, except paving, flooring and tracklaying. In the New York approach the quantity of steel is about 12,000 tons; of granite masonry about 3,500 cubic yards; of concrete about 2,500 cubic yards, and of brick about 1,500 cubic yards. The quantities for the Brooklyn approach are: Steel, about 6,000 tons; granite, about 2,500 cubic yards; concrete, about 2,000 cubic yards, and brick, about 2,500 cubic yards.

A part of this contract will be the covering of the anchorages, which will consist of steel shapes supported on the masonry of the anchorage, the spaces between the beams to be filled in with brick arches laid in cement mortar. These arches and beams are to be covered with concrete and cement mortar and asphalt, with intermediate layers of tarred paper.

The approach at the end of the bridge will be masonry walls filled with earth. The terminal masonry includes walls, stairways, arches, etc., the passageways and stairways to be lined with enamelled brick. Between the masonry approach and the shore end of the end spans is a steel viaduct of braced columns on masonry foundations, the floor to be covered with buckle plates or trough flooring as specified. The pedestals for the lamp posts at the terminal are to be of one piece of granite each. Along both sides of the masonry approach and around the anchorage is to be a heavy bronze railing. The viaduct is to have a steel lattice railing.

Trough floors are to be provided for the trolley tracks, bicycle path and roadway over Attorney street and for the footwalks over Ridge street. Buckle plate floors are to be provided for the trolley tracks for the entire remaining length of the viaduct up to the anchorage. The copings and dimension stones are to be of granite.

All of the steel whether rolled shapes or castings, is to be made in an open-hearth furnace lined with silica. For the shapes the stock must be pig iron or pig iron and acid open-hearth scrap, the latter not to exceed 25 per cent. of the charge. No portion of the stock shall contain more than .10 phosphorus or .05 sulphur. The finished steel shall not contain more than the following proportions:

Ph	.07	Si	.10
S	.04	Cu	.02
Mn	.50		

The shapes and plates must have an ultimate strength of from 60,000 to 68,000 lbs., elongation 22 and 20 per cent. in 8 in., reduction of area 44 per cent. The rivet rods must have a tensile strength of 54,000 to 60,000 lbs., elongation 25 per cent., reduction of area 50 per cent. The chemical limits for the cast steel are:

Ph	.06	Mn	.80
S	.04	Si	.35

The cast steel shall have not less than 60,000 lbs. ultimate strength and 20 per cent. elongation in two

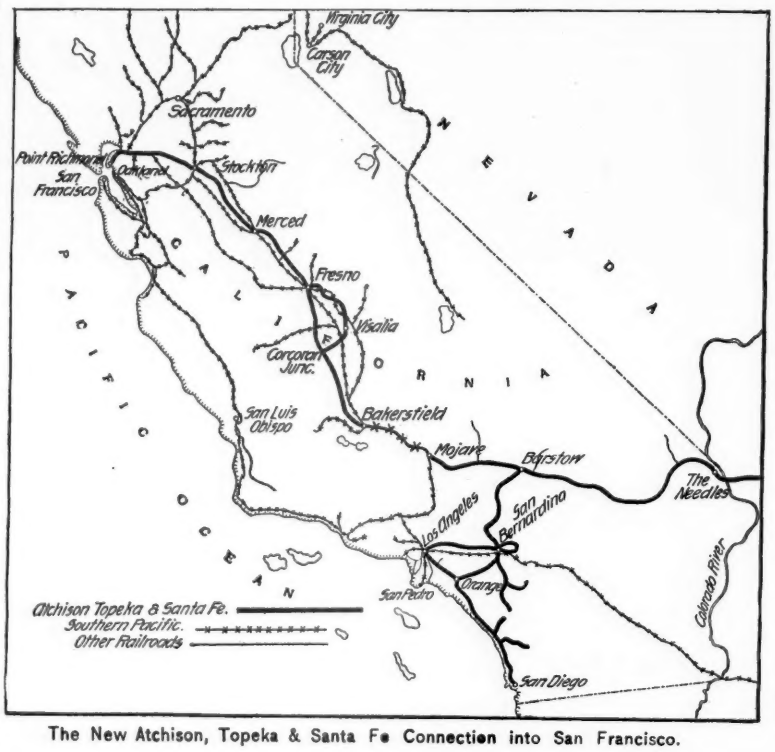
inches and shall bend to 90 degrees around three times the thickness of the test pieces. All finished steel must be rolled or forged from sections which are of a size to reduce 16 times in area in forming the finished shapes.

Completion of the Atchison to San Francisco.

For the first time the city of San Francisco has a transcontinental railroad connection other than the Southern Pacific. The laying of the tracks of the San Francisco & San Joaquin Valley line of the Atchison into Point Richmond, Cal., has completed the last link. Henceforward the people of San Francisco and of the fertile San Joaquin Valley are to be served by another great railroad system.

The San Francisco & San Joaquin Valley was chartered, as an independent railroad, Feb. 26, 1895. Its establishment was the result of a popular movement at San Francisco for additional railroad facilities. Enthusiastically supported by citizens along the line, it was aided by grants of right of way and bonuses to the extent of at least $500,000. Funds to begin building were obtained from the public sale of capital stock at par. So eager were the people to subscribe that $2,474,800 was paid into the treasury of the company. Before this money was expended a mortgage was executed to secure bonds to the amount of $6,000,000. These bonds, bearing interest at 5 per cent. and maturing in 1940, were sold to a syndicate on favorable terms, the proceeds to be issued as rapidly as the building of the road demanded. Of this amount $2,671,000 was issued up to June 30, 1898, a short time before the road passed under new control. It was then estimated that there was sufficient funds on hand to complete the road, including terminals, ferryboats and barges at San Francisco. Claus Spreckels, the well known sugar refiner, was made President of the company. And there were associated with him on the directorate such men as Robert Watt, A. H. Payson, Charles Holbrook and J. D. Spreckels. The Bank of California acted as Treasurer.

The plans as originally projected included a line from San Francisco south 305 miles to Bakersfield. As much the hardest part of the line to build was between San Francisco and Stockton and as the San Joaquin River furnishes a fine waterway to Stockton, it was decided to begin building at Stockton. Construction was begun in 1895 and by the end of the year 26 miles of track was laid south to the Stanislaus River. During 1896 track was laid as far south as Fresno, in all 125 miles. Early in 1898 the road was completed to Bakersfield, 235 miles. At the same time the company was building a loop line of 68 miles from Fresno through Visalia and Tulare, joining the main line again at Corcoran Junction. This loop was completed in 1898.



The New Atchison, Topeka & Santa Fe Connection into San Francisco.

For the past two years the company has been at work on the final link of 69 miles from Stockton west to San Francisco. There the difficulties have been considerable. A 10-mile section of the road, beginning eight miles west of Stockton, is through swampy land. Other sections pass through mountain country and required several tunnels, the longest of which is about 5,600 ft. Now the track is laid to the terminal.

The Chief Engineer of the Atchison System made an inspection in 1898 of the line then completed and summed up his opinion in these words:

> Taking the road as a whole, it bears evidence of having been planned, located and built by people familiar with their business, and every care seems to have been taken to so locate and construct the road as to put it on an equal footing with its competitors in the future. . . . The constructed line of road between a point three miles west of Bakersfield and Stockton is in excellent condition and capable of handling any traffic that could be imposed upon it by a transcontinental line. The grades are about three-tenths of one per cent., or about 16 ft. to the mile, and the alignment is exceptionally good. The roadbed and embankments are 16 ft. wide with slopes of 1½ to 1. The track is laid with steel rails weighing 62½ lbs. to the yard: 17 ties to the rail are used, or about 3,000 to the mile. Servis tie-plates are provided on every tie: ties are of redwood, 6 in. x 8 in. x 8 ft. long: split switches and Ramapo stands are used. The station buildings and section houses are commodious, and the style of architecture is attractive. The terminal grounds at all the important points are ample for any business likely to be offered, and at intermediate points sufficient ground has been obtained so that additional side tracks can be put in as wanted without buying additional right of way.

At the time this report was made the Atchison had under consideration a proposition to take over the road through the purchase at par of practically all the capital stock. On Dec. 8, 1898, this proposition was agreed to by the Atchison stockholders and during the same month the purchase was completed. The actual transfer took place the following July. But the new road extended no further south than Bakersfield, which left a gap between it and the Atchison's line. A number of plans were proposed for making this connection, chief of which was a proposition to build through the Tejon Pass to Rogers, about 80 miles. But before any building was done, the Southern Pacific decided to give the Atchison trackage rights over its line from Mojave to Bakersfield, 68 miles. Much surprise was expressed that the Southern Pacific should have granted this privilege to a company which planned to become a rival in the trade of a most fertile valley.

At San Francisco the Atchison, like the Southern Pacific, gets into the city by ferry across the San Francisco Bay. The railroad terminals have been established at Point Richmond. Ferries are to land the passengers at the union station in the city. Elaborate plans are being carried out for freight terminals in San Francisco under a company with a separate charter, the Santa Fe Terminal Co. of California. It is proposed to accept freight for delivery over the Point Richmond route by May 1. Through passengers will probably not be taken until two months later. The management does not wish to begin passenger service until trains can be put on to carry passengers without change from Chicago to San Francisco, approximately a distance of 2,568 miles. The shortest route to San Francisco, that via the Chicago & Northwestern, the Union Pacific and Central Pacific, is 2,419 miles, or about 150 miles shorter. The Atchison already runs trains into California but its sleepers are carried into San Francisco over the tracks of the Southern Pacific. For the first time a through transcontinental service other than that supplied in part by the Southern Pacific will enter San Francisco.

Though the Atchison owns substantially all the stock of the San Francisco & San Joaquin Valley, the new company is not to be absorbed into the parent company. It is to be operated as are the Atchison's other proprietary lines, the Gulf, Colorado & Santa Fe, the Santa Fe Pacific and the Southern California. The new road with no connection south of Bakersfield and without access to San Francisco except by boat from Stockton, shows gross receipts for the year ended June 30, 1899, of $408,705. This is about $26,000 more than was needed to cover operation, but was not sufficient to pay the $133,550 interest on the outstanding bonds. A large proportion of these bonds, however, was issued for the section from Stockton west and then uncompleted. On the 279 to 303 miles of finished road these gross earnings showed an average of about $1,400 per mile, or less than a fourth the earnings per mile of the entire Atchison System. Under the new conditions, however, as a connecting link for a great transcontinental line to the metropolis of the Pacific, it is reasonable to expect a large increase in its earnings. The new road adds about 375 miles to the Atchison and makes that system aggregate nearly 7,500 miles.

The International Railroad Congress.

Our readers have probably in mind the fact that the sixth session of the International Railroad Congress will begin in Paris Sept. 20 and last about a week. The programme of questions and the names of a few of the Reporters follow. It would take too much space to give the names of all the Reporters.

I.—Nature of Metal for Rails. This will consider the hardness of rail steel, suitable length, wear and oxidation and metallurgy. Reporter for the United States, Mr. P. H. Dudley; other countries, Messrs. Bricka, Inspector-General of Public Works for the Colonies, and Poulet, of the Southern Railroad of France.

II.—Rail Joints; Recent Improvements. Reporter for all countries is Mr. W. Ast, Director of Construction of the Emperor Ferdinand Northern Railroad.

III.—Points and Crossings; General Rules for Construction with Especial Reference to High Speeds. Reporter for England and the Colonies, Mr. W. B. Worthington, Engineer of the Lancashire & Yorkshire; for other countries, Mr. Cartault, Chief Engineer of Permanent Way, etc., of the Paris, Lyons & Mediterranean.

IV.—Maintenance of Way on Lines of Heavy Traffic. Reporter for Holland, Austria, Germany, etc., Mr. J. W. Post, Engineer of the Netherland State Railroads.

V.—Methods of Dealing With Snow. Reporter for Russia, Mr. Serge Kaerischa; for Italy, Mr. Ovazza and Mr. Rocca, engineer officers of the Mediterranean System of Italian Railroads.

VI.—Construction and Tests of Metallic Bridges. Reporter for all countries, Mr. Max Edler von Leber, of the Austrian Ministry of Imperial Railroads.

VII.—Transition From a Rising to a Falling Gradient. Reporters, Messrs. Sabouret, Chief Engineer of Permanent Way and Works Orleans Railroad, and Mr. Van Bogaert, Chief Engineer Belgium State Railroads, etc.

VIII.—Preservation of Timber.

IX.—Ballast. Reporter for the United States, Mr. A. Feldpauche, Pennsylvania Railroad.

X.—Creeping of Rails.

XI.—Exhaust and Draft of Locomotives. Reporter for the United States, Mr. C. H. Quereau; other countries, Mr. Edouard Sauvage.

XII.—Locomotives for Trains Run at Very High Speed. Reporter for the United States, Mr. Axel Vogt; for England and the Colonies, Mr. T. Hurry Riches, of the Taff Vale Railway; for other countries, Mr. Du Bousquet, of the Northern of France, and Mr. Herdner, of the Southern of France.

XIII.—Stability of Locomotive Axles.

XIV.—Banking, Piloting or Double-Heading.

XV.—Purification of Feedwater for Locomotives. Reporter for all countries, Mr. J. A. F. Aspinall, General Manager Lancashire & Yorkshire Ry.

XVI.—Use of Steel and Ingot Iron for Locomotives and Rolling Stock. Reporter for the United States, Mr. C. B. Dudley; for other countries, Mr. Durant, of the Paris & Orleans.

XVII.—Brakes and Couplings of Carriages and Wagons. Reporter for the United States, Mr. G. W. West.

XVIII.—Economical Size of Goods Trucks or Capacity of Freight Cars. Reporter for the United States, Mr. L. F. Loree; for England, Mr. C. J. Owens, General Manager London & South Western; for the English colonies, Mr. Charles Oliver, Chief Commissioner of Railways, New South Wales.

XIX.—Light Railways and Electric Traction. Reporter for the United States, Mr. N. H. Heft, of the New York, New Haven & Hartford.

XX.—Automotor Vehicles.

XXI.—Train Lighting.

XXII.—Handling and Conveyance of Broken Loads. Reporter for the United States, Mr. J. H. Olhausen; for England and the Colonies, Mr. Charles Jesper, General Goods Manager, North Eastern Ry.

XXIII.—Long Distance Goods Trains.

XXIV.—Economical Interlocking Apparatus.

XXV.—Automatic Block System. Reporter for the United States, Mr. E. C. Carter.

XXVI.—Signals for Repeating Visible Signals.

XXVII.—Use of the Telephone in Working Traffic. For England and the Colonies, Mr. J. Ireland, Telegraph Superintendent, Great Northern Ry.

XXVIII.—Safety Appliances for Preventing Collisions from Runaway Wagons.

XXIX.—Sorting by Gravitation. Reporter for all countries, Mr. Richard Bianchi, of the Italian Railroads, Mediterranean System.

XXX.—Distribution of Rolling Stock.

XXXI.—Accounts. Reporter for the United States, England and her colonies, Mr. Thomas Waddington, North Eastern Ry.

XXXII.—Railway Clearing Houses. Reporter for the United States, Mr. G. R. Blanchard.

XXXIII.—Grouping of Goods.

XXXIV.—Technical Education of Railway Servants; Appointments and Promotion. Reporter for the United States, Mr. George B. Leighton.

XXXV.—Co-operative Societies, Stores, etc.

XXXVI.—Facilities for Customs Inspection.

XXXVII.—Influence of Light Railways on the National Wealth. Reporter for England and her colonies, France and Germany, Mr. Colson.

XXXVIII.—Means of Developing Light Railways. Reporter for England, Mr. Joseph Tatlow, of the Great Western; for other countries, Mr. W. M. Acworth.

XXXIX.—Main Lines Crossed by Light Railways.

XL.—Conveyance of Farm Produce to the Stations on the Main Railways. Reporter for the United States, Mr. J. T. Harahan; for England and Colonies, Mr. Walter Gardner, of the Great Eastern.

XLI.—Carriages and Wagons for Light Railways.

XLII.—Warming of Carriages on Light Railways.

Aside from these reports there is a list of eight topics for general discussion covering a variety of important and interesting matters. Among these topics we find "The Use of Liquid Fuel," by Mr. James Holden; "The Working of Suburban Passenger Traffic," by Mr. Drury, of the Great Eastern, and "Construction Tests of Metallic Bridges in Russia."

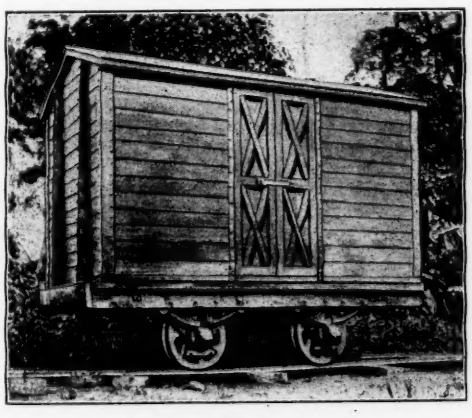
A cable received just as we go to press informs us that the Congress will open Sept. 20 and close Sept. 30.

The Railroads of British North Borneo.

The modern history of British North Borneo dates back to the occupation of the island of Labuan by the British in 1847. Early in 1881 the British North Borneo Provisional Association, Limited, was formed and a petition was addressed to Her Majesty for a Royal Charter, which was granted on the 1st of November, 1881, whereupon the British North Borneo Company was founded in May, 1882. In 1890 the British Government showed its confidence in the company by placing the island of Labuan under its administration.

The present area of British North Borneo covers 30,403 square miles, and with the islands belonging thereto, over 31,000 square miles. The coastline of the mainland measures about 900 land miles. Geographically and strategically, the situation is important, the west coast bordering on the highway of vessels trading between Europe, India, China and Japan, while the east coast overlooks that of vessels plying between China, Japan and Australia. The entire population of the company's territory is estimated at about 200,000, including about 20,000 Chinese.

The conditions have not been favorable for the development of railroading, but recently the Government has granted leases of estates amounting to 1,000,000 acres for planting tobacco, pepper, coffee, etc., and when these are under cultivation the demand for transportation will be considerable. Obstacles in the way of railroad construction present themselves in the jungles and mountains.



Freight Car Built in Borneo.

There is now open to traffic in British North Borneo twenty-five miles of railroad. Thirty additional miles of track is under construction, and sixty miles is being surveyed. The rolling stock consists of three engines and eighteen cars, two of which are for passengers, and the gage is one meter. The railroad is owned by the British North Borneo Company, whose headquarters are at 15 Leadenhall Street, London. Mr. Arthur J. West, of Labuan, is the Resident Engineer of the Company.

The idea is first to carry the fifty miles to Sapong, and then cross the country to the east coast, saving 500 to 600 miles of coast line.

In his last report Mr. West says: "There is a regular service between Bukau and Beaufort. The permanent way is now in very good condition. On the 11th, 13th and 16th of June, 1898, we began carrying trainloads of twelve cars from Bukau to Beaufort. The Murut population has doubled during the last six months, people coming from all quarters to plant rice by the side of the line. Going north from Bukau, most of the jungle is cleared for nearly ing operations are in full swing. The same can be said of the other portion of the population between Bukau and Maraba." It will not be long, perhaps, before a railroad will cross the boundary into Sarawak, and make valuable timber-land, plantations and mines accessible to capital. There is now a large demand in the Philippine Islands for timber, which Borneo, only two days distant, could well supply did there exist the facilities for transporting the logs to the sea. But the railroad is yet in an undeveloped state to undertake hauling such heavy material.

Weston, the starting point of the North Borneo Railroad, has a shop where cars are built. Locomotives, however, must be imported.

A Railroad Station in Borneo.

A Very Temporary Railroad Bridge—Borneo.

The Preservative Treatment of Timber.

At the meeting of the Western Society of Engineers held March 21, Mr. Chanute read a paper on "The Preservative Treatment of Timber" containing much important detailed information, a great part of which, however, has appeared recently in one form or another in the Railroad Gazette. We give below extracts from the discussion.

Mr. W. W. Curtis: With reference to the effect of burnettizing upon the strength of timber, I want to speak a word of caution. Very few experiments have ever been made, to my knowledge. Because the timber burnettized twenty years ago proved to be brittle, it does not follow that timber as now treated would be so. I am somewhat doubtful as to the chemicals injuring the strength of the timber. It seems more probable that such injury is due to the heat; and as even higher heat is used in creosoting, it is claimed without injuring the strength, I would suggest that it is desirable to determine the facts by present tests, instead of assuming that the matter is already proven. I notice statements of laboratory tests of timber treated by the Hasselmann process, in which the strength apparently is not impaired. I doubt if burnettizing is any more injurious.

The Atchison, Topeka & Santa Fe, at its Las Vegas works, treats not only ties, but piles and bridge timbers as well; indeed, all bridge material except the stringers, which are Oregon fir and are quite durable in their natural condition. The manager of the works advises me that they are well satisfied with the results. The piles are used in both wet and dry locations. This road proposes using treated ties on the entire system this year, all being treated by the zinc tannin process.

I am a firm believer in the use of the process which the author of the paper is using, and particularly a believer in the three injection process rather than the two injections. This is covered perhaps in the paper, but for the information of those who do not know, I might say that the original process was an injection of the zinc and the glue in one mixture, which was then followed by an injection of the tannin. Now, the process is modified by injecting the three solutions separately, which, in my judgment, is a great improvement.

Mr. Chanute has already referred to the fact that the simple burnettizing process—that is, where the zinc chloride alone is injected, will probably give very good service under favorable conditions in this country. There are but two roads, I believe, using this process in this country, the Southern Pacific and the Chicago, Burlington & Quincy in its Black Hills work, both of which roads are working under favorable conditions. The Southern Pacific for five or six years, has been using the burnettized ties on its Oregon line and in Northern California, and I was told last week that so far the results have been very satisfactory.

The only other point that occurred to me was with reference to the matter of testing of ties to determine the amount of the chloride that had been injected. The officers of the Southern Pacific road have devised a method of testing which is so simple that the foremen in charge of the works are able to make the tests. The sample borings from various ties are each burned to an ash, over a gasoline jet, in a porcelain roasting dish, in contact with the air. The ashes are carefully collected in a platinum cup, distilled water added, with a slight excess of hydrochloric acid, converting the zinc oxide into zinc chloride. It is then filtered into a test tube and the zinc hydrate thrown down with sodium carbonate, making a white flocculent precipitate. The liquid is then made up with distilled water to 3 drachms. The resulting milky liquid is compared with standard liquids in tubes of the same size as the test tubes, each tube containing 3 drachms. The standard liquids are graded to represent .06, .09, .12, .15, .18, .21, and .24 pounds of zinc chloride per cubic foot of timber.

Mr. J. H. Warder: I would like to ask if Mr. Chanute can give us an explanation of how in his process he uses three solutions.

Mr. Chanute: There is a fact well established from hundreds of experiments with an experimental plant which we have, that the addition of gelatine to the chloride of zinc solution made the latter less fluid, rather viscid, and that the solution therefore did not enter into the wood in the same quantities, nor penetrate as far; therefore I changed the process, which was still, however, under the original patent, as the specification covered fully the change I made. This was to inject first a solution of chloride of zinc, and that we make just as limpid as water, so that when held up in a glass it is as clear as the Chicago water is now. That is injected as a first solution, after the wood has been prepared first by steaming and then by vacuum in order to clear the pores of the dead air as far as possible. The injection is done under a pressure of 100 pounds and a temperature of 150 degrees F. We find we can extract more sap from a partially seasoned tie than from one fresh cut; the one fresh cut has three times as much sap, but we can not get it out, and I attribute that to the fact that when the tie is fresh cut, it is impracticable to heat the interior of it sufficiently to change the watery portions of the sap into steam. We are therefore not placing motive power behind to push the sap out of the sap duct; while, after it is partially seasoned, air has flowed in, and by heating that air it acts in expansion and pushes the sap out, so that after a period of steaming (in order to heat the timber and the air inside of it) we create a vacuum, during which steaming and vacuum we find that the sap comes off abundantly.

In our own plant at Mount Vernon we measure the sap by catching it in a tank with an attached glass tube, so that from each load we know just how much sap is being extracted, including some condensed steam that passes off with it. Then the chloride of zinc solution is admitted to the cylinder, and a pressure of one hundred pounds to the inch is placed upon it. That pressure is continued for about three hours, with an initial temperature of 150 degrees F. At first the timber absorbs it readily, then little by little it refuses until, toward the last, the pump has to work at its lowest possible speed in maintaining the pressure. We then know that the operation is terminated; but in order to make sure of the quantity which we desire to put in, and knowing the quantity of wood that is in the cylinder, the amount of the solution which we want to inject is put into the measuring tank, and from that measuring tank we pump until the entire quantity has been injected.

After the chloride of zinc has been absorbed the quantity of that injected is checked in two ways,

first, by observing the floats in the tanks which show the exact amount, being graduated in hundreds of feet; then again, and, secondly, at our new works, by weighing the ties before they are treated and weighing them afterward, it is certain that we have injected the required quantity. We then pump compressed air into the retort and blow the solution back into the storage tank, so as to clear the cylinder of it. Then the second solution is admitted—that of gelatine—and a pressure of 100 pounds to the square inch is put upon that. As I stated in my paper, it does not go very far into the wood, because the wood has been pretty thoroughly filled by the first solution. The second solution penetrates perhaps three-quarters of an inch. Then that solution, after a half hour or an hour's pressure, is blown back into its tank and the third solution is admitted, on which a pressure of 100 pounds to the inch is also applied, so as to force it in; then that is blown back into the proper tank and the operation is considered completed. It takes about twelve hours. The doors of the cylinder are then opened and the ties are hauled out.

The moment they are hauled out they begin to "bleed"; that is to say, the air which has been occluded in the sap cells and which has been compressed to 100 pounds to the inch by the various solutions that have been forced in, re-expands and forces out little bubbles of the solutions at the ends. The ties come out evaporating abundantly. They begin at once to dry, so that if a buggy load is weighed next morning after treatment it does not weigh as much as immediately after it comes out of the retort.

We have found that the method of weighing in and out is a great improvement and a great check, so that it has enabled us to work for an entire year and to hit within less than one per cent. of the quantity we desired to inject.

The price paid for treatment in Germany for first-class pine is 15.6 cents and 18.8 cents for beech in straight burnettizing. For the "zinc creosoting" process the price paid is 19.2 cents for pine; 20.4 cents for beech, and 15.6 cents for oak. Those are for the two zinc processes. We are doing it almost as cheaply in this country as in Germany.

Mr. Bainbridge: I would like to say in regard to the Southern Pacific, that it was one of the first roads to take up this tie treating. They have to depend, I believe, almost altogether on the pitch pine for ties. It is a timber that looks very much like white pine, but it only lasts for a number of years.

Prof. W. D. Pence: Reference has been made to the question of preservation of piles from the attacks of the teredo. In my experience, the creosoting, unless it is very thoroughly done, fails inside of a very few years. I have in mind some creosoting which was done in 1876, and only a very small number of the piles survived at the end of sixteen years. I should like to have Mr. Chanute's analysis of how creosoted piling failed.

Mr. Chanute: I do not know. I have never had any experience with creosoting, but I understand in a general way that the failure of creosoted piles arises from one of two causes, viz.: either the creosote has not been of the proper quality—and Mr. Boulton insists that that is the reason why they fail—or, second, there has not been enough of it put in. If the pile be thoroughly and completely filled with creosote, and it is creosote of the proper quality, the teredo does not get in and he does not eat the wood.

Mr. Cooley: I had some correspondence with Ricker, Lee & Company, formerly contractors of the Drainage Channel, who had in charge, I believe, the creosoting works at Galveston, and they cited the case of Galveston Bay which the gentleman has alluded to, I believe. They stated that in that case there was seven or eight pounds per cubic foot used in the original creosoting, and I believe they claimed that twenty pounds per cubic foot was injected afterward, and a few of these last piles are intact to-day. I believe those are the figures; I may be wrong as to the exact amount that is stated in the correspondence. The general idea corresponds with the statement already made by Mr. Chanute, that we can hardly put in enough to insure absolute immunity.

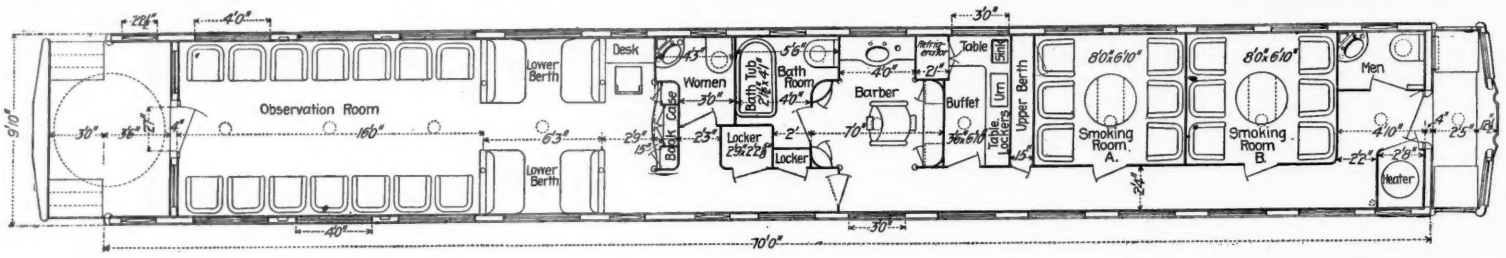
Mr. C. L. Strobel: I believe the difficulty is that the heart wood does not take much creosote. I am informed that in the Lake Ponchartrain trestle work of the New Orleans & Northeastern Railway an attempt was made to treat the yellow pine timber. They used a certain quantity of creosote, and while the sap wood absorbed the creosote readily, and while there was no difficulty about getting the quantity prescribed into the sap wood, it was utterly impossible to get it into the heart. And furthermore, it seems that the degree of penetration is generally small, and, whenever there is any framing to be done, especially if bolt holes are to be cut into the timber, that becomes a vulnerable point and the teredo gets in there. The creosote protects the outside shells and the ends of the piles very well, but is not found in the interior to any great extent.

Observation Car for the Northern Pacific.

The Barney & Smith Car Co., of Dayton, O., has lately built for the Northern Pacific a number of handsome observation buffet cars, of which the floor plan is shown in the engraving printed herewith. One of these cars, with other new cars—sleeping and day passenger cars and baggage cars—is running on each of the new trains called the North Coast Limited, a through daily train from St. Paul to the Pacific Coast, which was put on this week.

The plan shows a car divided into four parts, an observation room, a sleeping section, two smoking rooms and a central portion containing the buffet, the barber shop and the bathroom. In addition to these there is the observation platform, the ceiling of which is in the shape of a large dome. This platform is enclosed with a handsome polished brass railing. The chairs in the observation room are of wickerwork upholstered in plush. In the observation room there is a large oval center table. The card tables in the smoking rooms have folding tops, as indicated by the dotted lines. The car has a library and all the accessories usually found on the most luxurious trains.

All of the cars on these new trains are lighted by electricity, generated by a dynamo in the baggage car, and there are storage batteries for use in emergencies. The cars are finished in mahogany.



Observation Car for the Northern Pacific Railway; Built by the Barney & Smith Car Company, Dayton, Ohio.

American Railway Association.

The spring meeting of this association was held at Chicago, April 25, with a good attendance. The present membership is 233 roads, operating 184,215 miles of line.

The President has appointed as delegates to the International Railway Congress to be held in Paris in September, 1900, Messrs. J. Kruttschnitt, Southern Pacific; Joseph Ramsey, Jr., Wabash; S. T. Crapo, Pere Marquette, and Charles W. Buchholz, Erie.

Messrs. L. F. Loree, President of the Association, and W. F. Allen, Secretary, had already been appointed delegates.

The resolutions respecting an invitation being extended to the International Railway Congress to meet in Washington, D. C., in 1904, have been submitted to the members of the Association for a vote by letter ballot and have been unanimously adopted by a vote of 220 members, representing 161,010 miles of road.

In view of the fact that after Aug. 1, 1900, it will be unlawful to haul cars in interstate traffic unless they shall be equipped with automatic couplers, the association adopted a resolution to the effect that after June 1, 1900, no car not equipped with automatic couplers, whether belonging to a railway company or to private owners, shall be loaded except in the direction of home, and that from that date all such cars shall be returned so as to reach their owners before Aug. 1, 1900.

The Committee on Car Service presented a code of car service rules for discussion. It also recommended for adoption rules relating to stenciling light weight of cars and also rules defining what constitutes the delivery of a car. The report was debated at length and at the request of the committee referred back to it for further consideration.

The Committee on Safety Appliances reported that on Jan. 1, 1900, out of 1,283,679 freight cars in service, 1,191,189 (92.8 per cent.) were fitted with automatic couplers, and 818,180 (63.7 per cent.) were fitted with air brakes; also that out of 34,319 engines reported, 33,435 (97.4 per cent.) were equipped with power brakes. On Jan. 1, 1900, there were reported 102,485 freight cars under construction, all of which were to be fitted with automatic couplers and air brakes.

The Joint Committee on Interlocking and Block Signals presented a complete revision of the Block Signal Rules, and these rules were adopted by the association without amendment.

The Committee on the Metric System reported interesting information as to the extent to which the metric system has been introduced into actual use in the United States. The Committee on Statistical Inquiry and the Committee on Standard Dimensions of Box Cars reported progress.

The officers were all re-elected, as follows: President, L. F. Loree, General Manager Pennsylvania Lines West; First Vice-President, W. H. Baldwin, Jr., President Long Island Railroad; Second Vice-President, J. T. Harahan, Second Vice-President Illinois Central; Secretary and Treasurer, W. P. Allen.

Theo. N. Ely, Chief of Motive Power Pennsylvania Line, and Theo. D. Kline, General Superintendent Central of Georgia, were elected members of the Executive Committee. The Pennsylvania, Central of New Jersey and Canadian Pacific were re-elected members of the Committee on Train Rules. H. W. Ashley, General Manager Ann Arbor road; Geo. K. Lowell, General Superintendent Chicago, Indianapolis & Louisville, and W. G. Brimson, General Manager Omaha, Kansas City & Eastern, were elected members of the Committee on Nominations.

Complimentary resolutions were adopted congratulating W. F. Allen on the completion of his twenty-fifth year of service as Secretary of the association and of the other organizations which were its predecessors.

The next meeting of the association will be held at the South Union Station, Boston, on Oct. 24.

The Superstructure of the Vienna Railroad.*

The experiences gained in the construction and operation of the Berlin Railroad were utilized in the construction of the Vienna Railroad. The superstructure system of Haarmann, originally used in Berlin, did not show a favorable behavior, in spite of the use of iron ties and strengthened rails and joints. It was necessary to introduce tie rods at the curves to keep the gage constant. Stability of line and level could not be attained in spite of careful maintenance. After two years' operation the superstructure was already so much worn that it was necessary to replace it with wooden ties and ballast of basalt.

In 1890 the Prussian State Railroad Commission decided to introduce a heavier superstructure in some parts. The rails used were 29½ ft. long and 83 lbs. per yard, on 11 oak ties. This superstructure is particularly characteristic through the introduction of the bridge joint of Mr. Fisher. The results expected from the use of the bridge joint have not been found, and they do not expect to use them further.

The requirements of the concessions of the Vienna road left the question open whether to use wood ties or ties of steel. Considering the experiences gained in Berlin, and the greater cost of an iron superstructure, and finally considering that a large portion of the Vienna road would be run in an open cut and in a gallery requiring noiseless traffic, it was decided to use a heavy wooden tie superstructure for the main line, but for the tracks in the station at the switches an iron tie was to be used.

The rail, weighing 70.9 lbs. per yard, was chosen as used on the Austrian State railroads on lines having express traffic. The length of the rails is 41 ft. on 16 ties, with plates and six hooked spikes on each tie.

The wear on the top and sides of the rails has been small up to the present, and even at the curves the wear is not noticeable, so that from the behavior of the rails up to the present time, provided the traffic does not increase very much in the next years, a life of from five to six years can be expected, even at the curves, which is largely due to the joint, which is to be considered in detail. A very solid ballast of granite screenings was used.

The joint construction is different from that ordinarily used, and I want to say more about it, as its value is differently estimated. This joint consists of a piece of rail rolled from the same material as the main rail, 21.5 in. long, and this is put in place of the outside fishplate. For 7.2 in. its upper surface is on the same level as the main rail, while its ends are beveled off. The base of the joint rail rests on the same plate as the main rail. Between the joint rail and main rail a filler piece is introduced made of

*From a lecture by Hugo Koestler, Chief Engineer Vienna Railroad, January 18, 1900.

rolled iron, which has the object of transmitting the pressure of the wheels to the rails and prevents the connecting bolts from being subjected to a bending strain.

This joint was experimentally tried on the Berlin Railroad in 1895; an inspection of these lines showed that the rail joint actually resulted in the passage of the wheels over the joints without shock and thereby resulted in traffic almost without noise and shock. It was further noticed that a longer life of the rails resulted, and finally, owing to the smoother riding of the rolling stock, there was less loosening of the joint ties than usual, whereby the cost of maintenance was reduced. A favorable report of the Railroad Commission in Berlin caused the introduction of this joint on the tracks of the Vienna Railroad. It has been in use for one and three-quarter years,, and a few tracks have been in use for two and three-quarter years.

It will be of interest to examine how far the joint has come up to the expectations; of course, no final conclusion can be drawn, as the observation period has been too short; but the behavior of the rail joint on the Vienna road up to the present time permits certain conclusions to be drawn. Every one of you has observed that riding on the Vienna Railroad is as noiseless and as free from shock to-day as it was on the opening of the service. This was particularly noticeable at the time of the heavy frosts in the month of December, 1899, at which time the superstructure was entirely frozen in, in spite of which there were no shocks and there was no hammering. The wear of rails is very slight and no flattening or rolling has been noticed. A small portion (1 per cent.) of the rail joint had to be replaced during the first days on account of defects in the material.

The surfaces of rails are evenly worn over their whole length; I have not been able to find that there is a greater wear or flattening at the joints, and I have not found any indentations on the top of the receiving rail near the joint. In order to determine the behavior of the filler pieces a large number of joints were examined, and it was found that they had at no place been pressed into the bottom of the rail; no rubbing action was found, as in the usual fish joint, but the surfaces laid tightly together throughout their entire length. In the 12,000 joints no breaks of the inner fishplates have been found. As a result of this examination we come to the conclusion that the rail joint acts as a whole, and not a single case was found in which the rail joint would not serve to carry the wheel and therefore act as an outside fishplate. The usual short indentations at the joints are not present. This is a proof that the bending at the joints is much less than in the usual joint and does not exist as a permanent, but as an elastic bending.

The adjustment of the joint ties is very much less than with the usual joints. This makes the maintenance of the superstructure much easier and cheaper. I have not been able to give exact figures on this point, as no separate account has been kept of the cost of maintenance of the lines provided with these joints. On the basis of these experiences and observations, I believe that I can state that the rail joint on the Vienna Railroad has not only come up entirely to expectations, but that it will also in future do its service and above all will help to increase the life of the rails and of the entire superstructure.

On account of certain unfavorable conditions and of the heavy locomotives of the Vienna City Railroad, it would not have been fair to assume a longer life of the rails than on the Berlin Railroad. That would be from four to five years at the highest. According to the present behavior and condition of the superstructure, we can with certainty figure on a longer life, and it is evident that the additional cost will entirely be paid for by an increase in the life of the rail of one year. The saving in the maintenance of the superstructure and in the rolling stock is not figured in this. These savings must be pretty large, since they apply during the whole life of the superstructure.

I am sorry not to know the experiences with these joints on other railroads. I am glad to note, however, that in a letter which I have received recently from Mr. Loree, General Manager of the Pennsylvania Lines, he expresses himself as satisfied with experiments made with 1,350 joints introduced two years ago.

I cannot let this opportunity pass without pointing out certain precautions which must be taken with the joint in order that it may be successful. It is important that the main rail and joint shall be made of the same material, so that the wear on the two shall be the same. This precaution we have used, and the tests on the joint were made as thorough as the tests on the main rails, and gave the same average results. The surface of the track and of the joints must lie in the same level. It is therefore necessary to follow closely the prescribed profile and to use certain precautions in the building of the superstructure. When new rail joints are used to connect old rails this condition cannot be exactly specified, owing to the uneven wear of the track or of the rail, which will be noticed when riding over the structure, and which may also produce an uneven wear of the joints. The surface of the joint rail should not be broader than 0.79 in., as otherwise hollow tires run on the joint and drop on the main rail, producing an indentation. The division of the filler piece, as tried by several roads, is not to be recommended, as this piece can then no longer be used to transmit the pressure. The first result of this is that the joint rail does not act as an outer fishplate and the inner fishplate must serve alone. Under these circumstances it is, of course, possible that breaks of the inner fishplate occur.

On the Berlin Railroad the sharpest curve has a radius of 180 meters, and the wear of the outer rail is very great, and that these rails had to be replaced in 17 months. To diminish the pressure of the tires on the outer rails guard rails have been used in Berlin on all curves having a radius of curvature of less than 400 meters, and thereby an increase of three or four years in the life of the rails at curves was effected. As sharp curves are found on the Vienna Railroad it was intended from the beginning to introduce a guard rail. Here, however, the difficulty was found that with a flangeway of 2 in. the movement of three-axle cars would be impeded, which did not seem allowable. On this account the guard rail, which, with a larger flangeway would not have served its purpose, was not introduced. A particularly strong method of fastening the rails was therefore necessary which would insure a permanent width of gage. We therefore tried to attain this result by the use of a chair plate. This is very large, and the fastening of the rail on this chair plate was made with wedge plates, clamp plates and foot screws. The wear of the outer rails at the sharp curves is already noticeable, but does not give rise to fears that the life of these rails will be unusually short.

I cannot close without pointing out the favorable opportunity given to make frequent observations and measurements on the tracks of the Vienna Railroad. To keep a record of the wear of track and wheels, the cost of maintenance of track, etc., would certainly be of the greatest value.

Discussion.

Inspector Engerth does not agree with the author of the paper in his remarks on the fixed joint. If he means the old construction, he is correct, in so far as the terms "fixed" and "suspended" joints have never been suitable, as the so-called fixed joint was never a fixed one, and the suspended joint, because of the decided strengthening of the joint, was never a suspended joint. The construction in the future will consist of a combination of the advantages of both. This view is also taken by a number of railroads of the German Railroad Society in a recent report; in this suitable experiments were recommended, in which it was particularly noted that the bringing of the joint ties together has been found very satisfactory. He also requests the author of the paper to state whether creeping of the rails has been noticed on the Vienna Railroad.

Inspector Pfeifer.—It is evident that the necessity exists to find a joint construction which is free from the defects of the present construction. The fishplates must no longer be used, as the wear of the plates at the contacts and the resulting heavy shocks cannot be prevented. The favorable observations of the author of the paper on the rail joint considered by him are encouraging. It must, however, be pointed out that not a road of the Society of German Railroads has expressed itself favorably regarding this construction.

Electric Light and Power—Fort Madison Shops, A. T. & S. F. Ry.

The Fort Madison, Ia., shops are situated about midway between Chicago and Kansas City on the main line of the Atchison, Topeka & Santa Fe Ry. Fig. 1 shows the shops and yards looking east from the machine shop along the main track. The plant consists of a general office building, round house, machine shop, blacksmith shop, boiler and engine house; car repair, wood-working and paint shops, store houses, ice houses, an oil house and a transfer table on a track 600 ft. in length.

The power plant is in the engine room adjoining

Fig. 1.—The A. T. & S. F. Yard at Fort Madison, Ia.

the machine shop and consists of two generating sets of about equal capacity, one a direct-connected 35 kw. Westinghouse generator coupled to a 50 h. p. Junior type Westinghouse engine, and the other a 30 kw. Westinghouse generator driven by counter-shafting and a belt from the shop engine. By this method of driving the generators it is possible to use the surplus power when the shops are running on a light load; but at other times the direct-connected machinery is run. Aside from the economical use of steam in this method of installation, it gives both units a rest of about 12 hours a day, which makes an appreciable increase in the life of the machinery.

Lead-sheathed cables placed underground run from these generators to a marble switchboard. The generators are wired to the switchboard so that either or both may be run at the same time, and each gives its full share of the power consumed by means of equalizing bus-bars.

Throughout the buildings and grounds are distributed 200 16-candle power incandescent lamps and 16 2,000-candle power, long-burning, enclosed type arc lamps, and in addition to this are 35 eight-candle power, incandescent lamps for lighting the switches in the yards. For motive power one 35 h. p. railroad type Westinghouse motor is used to work the transfer table for the erecting shop and a 10 h. p. Gibbs motor to operate the round house turn-table.

The electric driven transfer table saves considerable time over other methods in common use. Formerly this table was equipped with a 50 h. p. vertical steam engine and boiler. It was necessary to keep up steam at all times and required the services of a man to run it. With the motor equipment the table can be used at any time and only a few seconds are required to move the table to the desired place. This motor receives its power from double conductor rails secured to (and insulated from) the wooden sleepers used as supports for the transfer table track. This method of installing the conductors and rails has given entire satisfaction and presents a much neater mechanical appearance than the ordinary trolley wire with its unsightly supports. The successful working of this transfer table is largely due to the able assistance rendered by Mr. T. Paxton, the Division Master Mechanic at this point. We are informed by Mr. Paxton that during heavy snow and sleet storms last winter no trouble was experienced whatever with the transfer table, but that the local electric street railroad should not be operated.

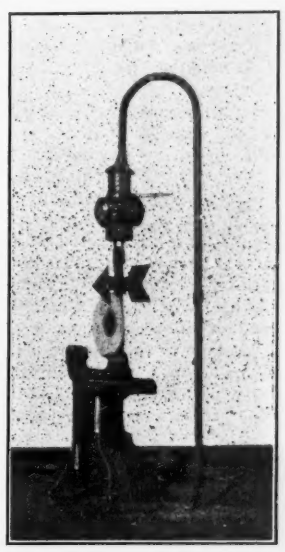


Fig 2.—An Electric Lamp for Switches.

The turn-table is worked by a 10 h. p. Gibbs "donkey" motor made by the Westinghouse Electric & Manufacturing Company. It is attached to one end of the table and runs on the same rail that supports the table. The electrical energy is transmitted to the motor by means of lead-sheathed wires running underground to the pedestal of the table, connection being made at this point to the motor with a small trolley underneath the table. The motor controller is at a convenient place on the table. Experience is not necessary to operate this table, and a considerable saving is made, as from three to five men were formerly required to move it when loaded.

The incandescent lights are distributed in the various buildings for general lighting purposes. In the machine shop a light is placed over each machine and at various points flexible connections are made for working in boilers and similar places, thus entirely eliminating the necessity for hand torches and oil lamps.

The arc lamps are used to light the yards, erecting shop and round house; and being of the improved long-burning pattern, they require very little attention, it being necessary to retrim them but once every ten days.

The eight-candle power lamps used for lighting the switches (see Fig. 2) are entirely successful. They save the salary of a lamp tender and the oil, and give a much better light than oil, besides being less liable to be extinguished, and the cost of maintenance is only nominal. The wiring for work of this character is somewhat expensive, for it must be the best possible to insure successful operation. The feeder wires for these lights extend throughout the yards on the pole line erected for general lighting purposes. At various points weather proof boxes are put on the poles, containing switches and cut-outs for the switch lights. From each of these boxes an iron pipe raceway is extended to the switch, where a substantial iron standard is secured to support the light. The standard is curved at the top and ends in an ordinary oil switch lamp. In this lamp is placed a weather-proof socket, which holds the electric light. The standard is so placed that no vibration is caused by passing trains. One of the lamps is shown in Fig. 2.

All machinery used for this plant is made for direct current working at 110 volts. The cost of maintenance of the entire plant since its installation has been an average of only $42 a month, which is less than the salary of the lamp tender, replaced by the electric switch light.

The entire plant was installed complete by the Arthur Frantzen Company, electrical contractors, 225 Dearborn Street, Chicago, Ill.

Railroad Legislation in Iowa.

The recent session of the Iowa Legislature passed three acts affecting railroads. The first one regulates the assessment of sleeping and dining cars. The annual statements of the railroads must "show the average daily sleeping car and dining car service operated on each division." The second enlarges the power to condemn. Section 1998 of the code of Iowa is amended so that any company operating a completed railroad shall have power to condemn lands for necessary additional depot grounds "or yards, for additional or new right of way for constructing double track, reducing or straightening curves, changing grades, shortening or re-locating portions of the line, for excavations, embankments, or places for depositing waste earth."

The third act regulates the sale and redemption of tickets. Every railroad must provide for the redemption at the place of purchase and at the general Passenger Agent's office of the whole or any integral part of any unused passenger ticket that such carrier may have sold; and shall redeem the same at a rate which shall equal the differnce between the price paid for the whole ticket and the cost of a ticket between the points for which said ticket has been actually used. No carrier shall limit the time in which redemption shall be made to less than ten days from date of sale at the place of purchase and six months from date of sale at the General Passenger Agent's office. Where the rate is regulated by statute tickets sold at the maximum legal rate must not bear any condition of limitation as to the time of use, or as to transferability, without first providing for the redemption of said ticket, as directed by the preceding section hereof, and also having notice of such provision and privilege of redemption conspicuously posted at each place where tickets are sold. To refuse or neglect to redeem a ticket within ten days is punishable by a fine of $100. Nothing in this act is to prohibit the sale of mileage tickets bearing reasonable conditions.

All of these laws go into effect July 4, 1900.

The Cape Cod Canal.

The project of a waterway across the neck of Cape Cod has for several years been agitated in the Massachusetts Legislature. Several stock companies have been formed and dissolved in connection with the scheme, but it was not until January, 1899, during the last legislative session, that a charter was granted to the Boston, Cape Cod & New York Canal Company. Nothing has been done during the year beyond a preliminary survey and some plans for a route.

During the present session of the Legislature, the bill granting the charter was called up for amendment by general agreement. On Wednesday, April 18, the amended bill was passed for engrossing by the Senate. This action is claimed by the promoters of the enterprise to be tantamount to a final acceptance, as the House has already voted favorably on the main act. The bill will go before the latter body probably early in the week, and will then pass to the enactment reading.

Amendments introduced by Senators Post and Atwell on April 11, and incorporated in the charter, grant practically all that has been asked by the petitioners with regard to the issue of stock and bonds and provisions for the cancellation of indebtedness. The maximum bond issue is fixed at $12,000,000, contingent upon the estimate of the Harbor and Land and Railroad Commissioners of the cost of construction. Stocks and bonds are to be under the control of the State Treasurer, who is to disburse only such sums as are directed by the dual Board, to the account of work actually done. Another amendment, probably introduced as a joke, provides that a deduction is to be made from the amount of the securities if any part of the cost of construction is paid by the United States Government.

The President of the company is General Charles C. Dodge, of New York City. The promoters will give no other names, but it is stated that Mr. Rignal Woodward of Boston is interested. The company has opened offices in Boston, and shares them with the Cape Construction Company, of which Mr. Woodward is President, and which is eventually to build the canal.

The proposed route is across the narrowest part of the neck, from Barnstable Bay to Buzzard's Bay, the western part following the course of Monument River. The length from tidewater to tidewater is about eight miles, but the amount of dredging necessary to reach deep water on the Buzzard's Bay side will increase this to 13 miles. An immense breakwater will have to be built off Barnstable, to shelter the entrance from the prevailing northeast storms in winter. The canal will cross the Old Colony Division of the N. Y., N. H. & H. RR. at three points, and the bill granting the charter provides that the expense of providing and maintaining drawbridges at these points shall be assessed upon the canal company by the dual Board.

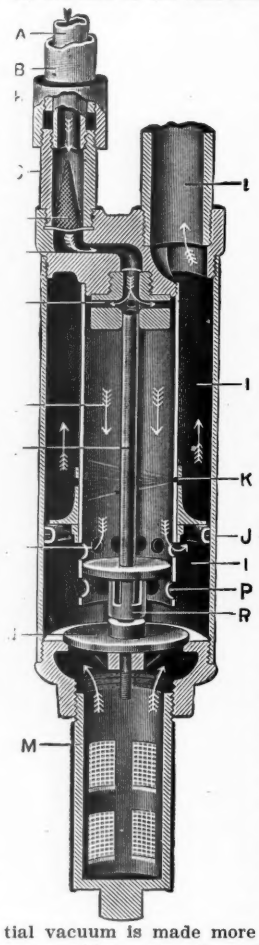
The depth at mean low water will be 30 ft., the width at the bottom 100 ft., and the width at the top 200 ft. The plans and surveys for the proposed route, bridges, breakwater, etc., have been made by Messrs. A. L. Rives and E. L. Cortheil, who are named as the company's engineers.

The advocates of the bill claim that the canal will benefit Boston and New England generally, and they advance the following facts and arguments: That Cape Cod is one of the most dangerous coasts known; that 30,000 vessels, of which 6,000 are steam craft, are compelled to round the Cape each year; that freight interests, especially those in perishable Southern fruits, will be greatly benefited by the estimated saving of one day's sailing time; that shipping rates on coal will be lessened, cheapening it over the whole of Eastern New England, and that a night trip from Boston to New York, without change, will be a great attraction in connection with passenger boats.

Boston, April 24.

The Erwin Steam Ram.

The Penberthy Injector Company of Detroit is putting on the market the Erwin steam ram for raising water to heights as great as 60 ft., the capacities varying from 4,000 to 8,000 gallons an hour, depending on the size of the ram and the lift; the steam pressure used is about 75 lbs. These are especially intended for use at locomotive water stations and where so used the pumping plant consists of the ram, which is placed beneath the surface of the water, and the boiler.



The construction of this ram will be seen from the accompanying engraving showing a sectional view. At the time of starting, the ram is filled with water which has flowed in by gravity. When steam is turned on it passes through the steam pipe A, nipple C. conical screen D, the main steam port E and radial steam ports F, into the cylinder G. The water is then forced downward through the openings H into the surrounding discharge chamber I, where it passes through the annular check valve J and out of the discharge pipe L. When the steam reaches the lower end of the cylinder G, it is exhausted through the large openings H faster than it is admitted through the steam ports F, is condensed in the surrounding discharge chamber I, and the partial vacuum is made more complete by a spray of water which enters from the discharge chamber I through the small opening K. When a partial vacuum is formed, the pressure of the atmosphere on the water outside of the ram forces water upward through the bottom strainer M. The main check valve N is then raised and the valve rod O, which is rigidly attached to it, shuts off the steam at the upper end of the cylinder. A volume of water under atmospheric pressure is at the same time forced upward through the discharge chamber and out into the discharge pipe. A portion of this water, however, passes through the openings P, forces up the float R, which moves freely on the valve rod O, and refills the chamber. The water under atmospheric pressure having then lost in momentum, the steam acting downward on the valve rod, closes the main check valve, and through pressure exerted on the float, again forces water out of the cylinder and through the discharge chambers and discharge pipe. A covering pipe B surrounds the steam pipe for the distance it is submerged beneath water, to prevent condensation.

The chief advantages claimed for this method of raising water are that no oil or packing is required, the ram needs little attention, the friction losses are small and steam is used economically. Two sizes are made, the "Standard" being adapted for working against a 60-ft. head, and the "Low Lift" rams against heads of 40 ft., in which case larger quantities of water are handled. The rams are brass and the strainers are malleable iron with brass screens.

Signaling As It Is and As It Might Be.

AN IDEAL ORGANIZATION.

BY A. H. RUDD.

(*Concluded from page 211.*)

Now as to maintenance. It does not pay to install work and then let it deteriorate. It should be always kept up to its initial efficiency. This can be done only by constant watchfulness, and sufficient force should be allowed, particularly with automatic signals, so that inspection can be made daily. The saving in delays to trains will pay for this additional care.

At large terminal stations this fact is fully recognized and proper maintenance given, especially where electro-pneumatic machines are employed. Observe the constant inspection at points such as the Pittsburgh, Philadelphia and Jersey City stations of the Pennsylvania, the Philadelphia terminal of the Reading, the Boston terminal of the Boston & Maine, and at the last and greatest of all, the South Station of the Boston & Albany and New York, New Haven & Hartford in the latter city. At this magnificent station all departments worked together so harmoniously during installation that the best results were attained, and the liberal policy of the Terminal authorities in dealing with the contractors has made possible the highest development of the work.

The same policy should prevail at outlying points, where delays, though not so annoying, still disarrange the service.

Signals are not infallible, and the possibility of one showing clear when it should indicate danger must be guarded against by every possible means. Weekly inspections, a common practice to-day, are not a sufficient safeguard, particularly for automatic signals at outlying points. A good deal may happen to them in a week. Tracks, engines and cars are inspected daily, and oftener, and air brakes whenever the composition of a train is changed in any way. The mechanism which gives notice that their application is required should be equally well maintained.

On long stretches of track in outlying districts, velocipedes or track bicycles will pay for themselves in six months, keeping expenses down and at the same time making this necessary inspection practicable.

Maintenance men should never be called on for construction work, but should be assigned a full daily task and be held to it constantly. With this end in view the following plan is recommended. As noted above, the Signal Engineer should have on his staff an electrician, a supervisor of interlocking and a foreman of construction.

Under the jurisdiction of the Electrician would come all electrical apparatus connected with automatic and "tower" systems, also crossing bells, telephones (where a separate department does not exist), annunciators, call bells, electric clocks, fire alarms, etc. Under the Supervisor of Interlocking, all mechanical work pertaining to the maintenance of fixed signals, and under the Foreman of Construction all new construction work.

Such assistants can be readily found, as numbers of men are competent in each of the branches, although those who combine two of them are few. They should be paid enough to command the best talent.

All Division Signal Inspectors, Repairmen, Batterymen and helpers will be appointed by and report to the Signal Engineer. No new work or extensive alteration is to be started without an order to the Signal Engineer from his superior. The Signal Engineer will then give the necessary instructions, and notify the Superintendent of the division in which the work is to be done.

In case the Division Signal Inspectors or Repairmen require assistance from the division roadway forces, they will notify the Signal Engineer, who will call on the Division Superintendent for such assistance as is required; excepting that in cases of emergency, they may arrange direct with the Division Superintendent, or with such officer as he may designate, the reasons for such action to be reported subsequently to the Signal Engineer.

Division Signal Inspectors or Repairmen must make all necessary and ordinary repairs promptly, but must not make any change in the signals, or renewals or extensive alterations, without proper orders from the Signal Engineer; excepting that in cases of emergency they may arrange direct with the Division Superintendent, or with such officer as he may designate; the reasons for such action to be reported subsequently to the Signal Engineer.

Division Signal Inspectors and Repairmen must keep the Signal Engineer, the Division Superintendent, and the telegraph operator at their headquarters advised at all times of their whereabouts.

Each division will have one or more Signal Repairmen of Mechanical Signals, who will be responsible for the proper maintenance and working of all interlocking and mechanical signals, and any other signal apparatus placed in their charge in the division. Repairmen must make constant examinations and see that all apparatus is properly maintained and operated, and that all lamps and fixtures are kept in good condition. They will make daily reports to the Signal Engineer and the Division Superintendent. They will observe all instructions they may receive from the

Signal Engineer or from the Supervisor of Interlocking.

There will be one Signal Inspector of Automatic Signals assigned to each division where automatic signals are installed to an extent requiring such Special Inspector. The Signal Inspectors of Automatic Signals will be assisted on each division by Signal Repairmen of Automatic Signals, Batterymen and helpers, as may be determined by the Signal Engineer.

The Signal Inspector of Automatic Signals will have charge of the Signal Repairmen of Automatic Signals, Batterymen and helpers on his division, and will be responsible for the proper maintenance and working of all automatic signals and any other signal apparatus placed in his charge. He must make constant examinations and see that all apparatus is properly maintained and operated, that all lamps and fixtures are kept in good condition, that the electrical bonding is maintained or speedily replaced when broken by track changes or otherwise, and locate all trouble promptly. He must be prepared at all times to personally make all minor repairs without calling on the Signal Repairmen. He will make daily reports to the Division Superintendent and to the Signal Engineer. He will observe all instructions he may receive from the Signal Engineer or from the Electrician.

The Signal Repairmen of Automatic Signals, Batterymen and their helpers must obey all instructions of the Signal Inspector, and make all necessary and ordinary repairs promptly, reporting in all matters to the Signal Inspector, and keeping him at all times advised of their whereabouts.

With an organization as here sketched, with sufficient funds allowed for enough skilled labor at good wages to make daily inspections, delays to trains would be vary rare, breakdowns being anticipated and repairs made before failures occurred. And it is far cheaper to employ a few good men than a number of poor ones. This is especially true in construction work, where it would be considered a proof of imbecility to pay fitters $2.50 or $2.75 a day for digging foundation holes when sufficient talent could be obtained at $1.35 to $1.50 and the work better done. It is scarcely less idiotic to attempt to use laborers as fitters and have them spoil as much material as they use, making it necessary to do work once and sometimes twice over and then having it not quite right, and taking a foreman's time when he might be better employed.

Such a course, however, is often pursued by Signal Engineers to-day from sheer force of necessity, through inability to secure the necessary appropriation for a better class of men. They all know its wastefulness, but they are helpless. This method would not be dreamed of in the shops, or in any of the other well organized departments, and it is to be hoped that the day has dawned when it may be abolished in the Signal Department also.

CONCLUSIONS.

Signaling has passed out of the experimental stage. Appreciation of its value, and knowledge of its details and theory of practice, on the part of managing officials as a rule has not developed as rapidly as the science itself. Consequently the work has not reached its perfect development on many roads through inability of the Signal Engineers to overcome preconceived ideas and prejudices and to obtain necessary appropriations.

It should be generally realized that proper signaling prevents accidents as well as aids in the handling of trains, and that incomplete or bad work increases the dangers.

Complete installations should therefore be the rule, and they should be erected with a view to future requirements and having in contemplation a general scheme of full protection when the entire work is finished.

Proper maintenance should be allowed for, including daily inspections of automatic signals at least, as there is no economy in allowing expensive plants to deteriorate. To accomplish these objects the departments should be placed on a better footing, with a general organization so that all work would be maintained by Signalmen, who should be paid sufficient wages to insure the best talent available. The saving in expenses should not be attained through low wages and cheap materials or workmanship, but economies should be effected by perfect organization, through keeping the size of forces and amount of stock on hand at the lowest possible limit, and all men constantly employed.

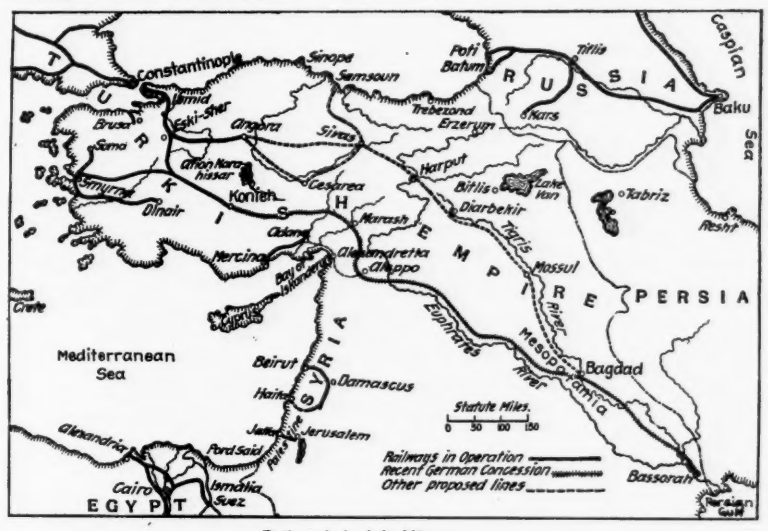
Signal Engineers should be given more responsibility and authority, with complete charge of their departments and all branches of the work, and allowed leisure time enough to keep themselves posted on all new methods and advances in designs, and not be compelled to do two men's work. They should be paid higher salaries than those now prevailing, in order to induce the best men to continue in the work and to make it an object for younger men to fit themselves in technical schools and by practical training for work of this character.

It is hoped that these suggestions will bring forth discussion from Signal Engineers, and that managing officials also will find some points of interest. At all events the present conditions have been noted and the possible development of the Signal Department outlined, as the matter appears to some, at least, of the Signal Engineers of American railroads.

Proposed Railroads in Asia Minor.

From apparently authentic reports it appears that the concession for the new railroad through Asia Minor to the Persian Gulf has been granted to the Anatolia Railroad, a German company which now operates a line from Constantinople southeastwardly to Konieh, about 300 miles. The extension is to run from the latter place southeastwardly through Marash and Bagdad to Bassorah. The line, as shown on the accompanying sketch, lies through Aleppo. This information, as well as the map, we take from a report by Consul M. A. Jewett, of Sivas, Turkey, published by the State Department in a recent issue of Consular Reports (No. 665).

It is said that the French company owning the railroad from Smyrna eastward to Afion Karahissar has been authorized to take 40 per cent. of the stock in the new extension, this having been the price of the withdrawal of this company's opposition; and local objectors had to be conciliated by a clause in the concession giving the Turkish Government the right to buy the railroad at any time. Consul Jewett thinks that the German company will take measures, in operating its new road, especially by making preferential rates, to constantly favor commerce with Germany as against other countries; and the Germans are said to control railroad traffic from Smyrna as well as from Constantinople. Germans own the line to Angora. Mr. Jewett suggests that if American capitalists wish to get the better of German interests they should secure a concession for a line from Samsoun to Bagdad. This line would open up a country which would furnish a much larger agricultural traffic than can be had on the line through Marash, as the latter traverses a barren and sparsely inhabited territory.



Railroads in Asia Minor.

A New Form of Car Trust.

Mr. Edward S. Avery of 67 Wall Street has devised a form of car trust which he thinks possesses advantages over the ordinary form of such trusts. The following is an extract from a letter in which the plan is outlined at length:

Car trust agreements require the payment of one-tenth or one-sixth of the unpaid cost of the cars annually and draw high interest. Most managers would prefer to obtain the capital for equipment by issuing first mortgage bonds, requiring no annual payment on account of the principal and drawing low interest. Repairs and renewals are supposed to maintain the integrity of the equipment as security. We propose an issue of car trust certificates or bonds in an amount equal to eighty or ninety per cent. of the cost of cars given as security, running for twenty or thirty years, requiring no annual payment on account of the principal, and drawing interest at the same rate as is obtainable on the railroad company's first mortgage bonds.

Are cars good security for a loan of thirty years? The integrity of such security could be maintained by monthly or semi-annual payments into a sinking fund, which would be expended at the end of say every third year in the purchase of new cars. This simply provides specifically for maintaining the equipment. A covenant to add new cars every third year might not require cash payments into a sinking fund. The following table shows how cars would depreciate in value but the integrity of the security be maintained. It begins with cars costing $100,000. They are supposed to depreciate at the rate of one-tenth yearly. New cars are purchased and added to the security at the end of every third year out of the sinking fund, which accumulates at the rate of 10 per cent. of the cost of the original cars each year during the first three years, 13⅓ per cent. per annum during the next three years and 16⅔ per cent. per annum thereafter. The salvage or scrap value of the original cars (20 per cent. of $100,000, or $20,000) could be applied in part payment of the sum required for the sinking fund in the twelfth year. Every third year thereafter about ten thousand dollars for salvage could be applied in the same way. Deduct also the interest on the sinking fund. Thus we have an average yearly net requirement of, roughly, $12,000 for the sinking fund, to which should be added $3,600 per year for interest at the rate of 4 per cent. on the $90,000 of certificates, making a total requirement of $15,600 per year. The purchase of new cars every third year keeps the equipment up to date, and results in an increase in the number of cars. There would be about twice the original number of cars in service after the ninth year. The value of the security is fully maintained during the first nine years, then it gradually increases until the eighteenth year, after which it remains at $110,000. At the end of thirty years the security, including the salvage value of old cars remaining on hand, would be worth $40,000 more than the debt of $90,000.

Value of the Wooden Cars at the Date of the Agreement, $100,000; Value at the End of the—

3d yr.	6th yr.	9th yr.	12th yr.	15th yr.	18th yr.
$70,000	$40,000	$10,000	.....	.....	.....
30,000*	21,000	12,000	$3,000	...	.....
	40,000*	28,000	16,000	$4,000	..
$100,000		50,000*	35,000	20,000	$5,000
	$101,000		50,000*	35,000	20,000
		$100,000		50,000*	35,000
			$104,000		50,000*
				$109,000	
					$110,000

21st yr.	24th yr.	27th yr.	30th yr.
$5,000	..	.....	.....
20,000	$5,000	.....	....
35,000	20,000	$5,000	.....
50,000*	35,000	20,000	$5,000
	50,000*	35,000	20,000
$110,000		50,000*	35,000
	$110,000		50,000*
		$110,000	
			$110,000

* New cars purchased out of sinking fund.

The size of the sinking fund in a specific case would depend upon the kind of cars, the work for which they were intended, etc.

Six ordinary car trusts of ten years each would be required to accomplish results which could be obtained by the use of one thirty-year car trust. If our certificates drew four per cent. interest as compared with five per cent. for the ten-year car trust certificates, we would effect a saving of about $1,500 per year in interest. The time and expense required in creating five ten-year car trusts would be avoided.

If steel cars, having a life of 20 years, were used, the annual payment into the sinking fund would be about one-half that shown in the table.

Eight-Coupled Tank Locomotive for Wales.

The Cooke Locomotive & Machine Company has recently completed two eight-coupled tank locomotives for the Port Talbot Railway of Wales; a road worked in connection with the docks at Port Talbot. The principal dimensions are as follows:

Gage	4 ft. 8½ in.
Fuel	Soft coal
Weight on drivers	137,000 lbs.
" " truck wheels	32,000 lbs.
" total	169,000 lbs.
Wheel base, total, of engine	22 ft. 1 in.
" " driving	15 ft. 6 in.
Length over all, engine	38 ft. 6 in.
Height, center of boiler above rails	7 ft. 11⅛ in.
Heating surface, firebox	128 sq. ft.
" " tubes	1,361 sq. ft.
" " total	1489 sq. ft.
Grate area	24 5 sq. ft.
Drivers, diameter	52 in.
" material of centers	Cast steel
Truck wheels, diameter	42 in.
Journals, driving axle, size	8 x 8⅞ in.
" truck " "	6¼ x 8⅞ in.
Main crank pin, size	5¾ x 5½ in.
Cylinders, diameter	19 in.
Piston, stroke	24 in.
Boiler, diameter of barrel	56 in.
Firebox, length	7 ft. 0 in.
" width	3 ft. 6 in.
" depth front	63½ in.
" " back	61½ in.
" material	Copper
" thickness of sheets	Sides ½ in., back ½ in., front ½ in. and 1 in.
Tubes, number	219
" material	Solid drawn brass
" outside diameter	2 in.
" length over sheets	11 ft. 11 in.
Smokebox, diameter	59 in.
" length	39 in.
Tank capacity for water	2,000 gal.
Coal capacity	2 tons

Special Equipment.

Wheel centers	American Steel Casting Co.
Tires	Latrobe Steel Co.
Steam gages	Ashcroft

According to a Belgian newspaper, if the Belgian State railroads accept a proposition made by the French Northern Railroad, a train will be put on between Paris and Brussels which will run through without stopping, except at the border, a distance of 192 miles, in less than three hours. At present the quickest time between the two cities is 4¾ hours.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856,
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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to improvements. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

In our news columns during the month of April orders were noted for 3,580 cars of all kinds and 161 locomotives. This is about one-third as many cars and less than one-half as many locomotives as were ordered in March, and bears out our prediction of last month. Of the cars ordered, 1,327 were box, stock, furniture and refrigerator, 1,302 were coal and gondola cars and the others were 726 flat cars, 11 tank, 22 steel and 32 passenger cars; 160 cars were ordered for street railroad service. Of the locomotives, 24 were for passenger, 128 for freight and 9 for switching service.

In our issue of April 20, page 250, appeared an interesting article on the Purdue University locomotive plant. The purpose of that article was to make public a plan devised by Prof. Goss for carrying on research and commercial tests by means of the locomotive plant at Purdue. The Trustees of the University are naturally unable to provide funds for the constant operation of the locomotive testing laboratory, and it is suggested that this could be put on a semi-commercial basis by the co-operation of locomotive builders and others having a business interest in the kind of work that can be well done at such an establishment. The hope is that means may be found to keep a permanent organization and to have the plant always in condition for commercial tests and also to carry on continuous experimental and research work. The attention of those who may not have seen the article in question is especially called to it again. Meanwhile, it does not seem necessary to reprint a synopsis of it.

The newspapers have recently kept us more or less informed about the doings of a great company organized to take over, expand and exploit the railroads of Cuba. It would be difficult to imagine any fortunate circumstance for that harassed island. The railroad situation there now is nearly as bad as it could be. The present Secretary of Public Works is trying to evolve some scheme of rates and classification that shall be just and practicable, but it is most difficult. The concessions granted by the Spanish Government separately to each company were granted with no harmonious underlying principles. Great favoritism was shown in various cases, and these concessions, existing as they still do, are in the way of any reform in rates. It must be remembered that the railroads themselves are run down in permanent way and in rolling stock, and, indeed, have never been thoroughly efficient. Money must be spent on them to put them into a condition to do their work safely, regularly and cheaply. On the other hand, the island itself is impoverished and it needs cheap and efficient railroad service more, almost, than any other one thing—perhaps actually more than any other one thing but good government. Obviously, the shippers cannot afford to pay high rates. Obviously, the railroad companies must find cash for improvements, and look to the future for their profits. Much the best way out of the dilemma is for one big company to absorb all the railroad lines, to weld them into one system, to lengthen that system as geography and the needs of trade indicate, to put the whole system into a good working condition and to make the rates low and to look for profits in the future. If the Cuba Company is prepared to do all this and sees a way to do it, every friend of the island should encourage that company.

We wrote recently (April 23, page 238) on the present standing of the steam motor car, the summing up of our study of the question being that, so far, it has been a failure. In this we are disappointed, because there are a good many places where the traffic developed or in sight does not appear to justify either frequent service with trains hauled by steam locomotives, or the heavy first charges of electrical equipment. Furthermore, there are many places where frequent service in small units is required for proper accommodation of the traffic and where the mechanical complications of electrical working are almost prohibitory. Situations of the first kind are found in and between small towns now inadequately served by steam railroads or served by no form of railroad. Situations of the second kind are found in the approaches to many cities of considerable size. An independent motor car that can be run by one man besides the conductor, and that can, if necessary, be sandwiched between trains, would serve many of these situations, and when the steam motor car was revived two or three years ago it seemed quite possible that it might be a solution of the difficulty. It appears, however, to have failed pretty completely. In writing April 13th we suggested that it might be possible to get better results with motor cars of this sort by using oil fuel. We find that one of the locomotive works has been experimenting pretty thoroughly in this direction, and has decided to give up the attempt. The proper combustion of oil requires a long flame way, which is out of the question in a vertical boiler with a small firebox, such as must be used in composite cars and such as seems to be necessary to provide for the proper combination of machinery and car body. It has been found impracticable to get the free steaming necessary to handle this class of motor car even with oil fuel. The reasons for the failure of these experiments have not been thoroughly developed, but the fact seems to have been pretty well established. It now remains for the compressed air people to demonstrate their power to supply the ideal, self-contained, independent motor car.

The Arch-Bar Truck Frame.

In a paper before the March meeting of the Western Railway Club, Professor C. V. Kerr describes a test made by him to determine the sustaining power of the side-frame of an arch-bar truck. The frame was of the ordinary type, in the design of which the tension and compression members are prevented from sliding over one another only by the box bolts. The paper gives no dimensions, but it appears from its discussion that the frame was designed for a car of 80,000 lbs. capacity.

The test was made by supporting the frame on bearing points placed in false boxes having outside dimensions similar to those of the usual journal box, and by loading it in the center, the whole arrangement being such as to make the conditions approach those of service. As a result of the test the deflection in the center of the frame was found to be approximately one hundredth of an inch for each thousand pounds of load. Under a load of 100,000 lbs. the deflection was just 1 in. Above this limit the deflection for each increment of load was somewhat greater than has been stated; when the load had reached 155,800 lbs. the box-bolts sheared and the frame is assumed to have failed.

Referring now to conditions affecting such frames in service, it should be said that the greatest load that can be imposed upon a side-frame by a car of 80,000 lbs. capacity when at rest, does not exceed 27,000 lbs., or about one-sixth the breaking load. When running, the motion of the car and inequalities in the track operate at times to considerably increase this value, but a measure of such increase is difficult to determine. It is evident that the maximum load cannot be greater than that which can be borne by the bolster or sustained by the axles, for the bolster is the medium through which the load is transmitted to the frame, and the axles serve as points for its support. From published reports of tests of steel truck bolsters and of axles, it may be concluded that any condition of service which puts more than 75,000 lbs. on a side-frame of a truck, designed for an 80,000-lb. car, will be likely to strain both bolster and axles to their elastic limit. This, then, may be accepted as the maximum load which, under any condition of service, can come on the side-frame. As this load of 75,000 lbs. is less than half the total load applied by Professor Kerr, it justifies the conclusion that the frame tested is enormously strong for the stresses it has to transmit.

It is a fact, also, that in service such frames do not fail because the load imposed upon them is too great. They have ways of their own in which they may fail, but they are never crushed. It is for this reason that the frame tested gave way in a manner quite unusual in service. Under the steady applied pressure of the testing machine, the bolts sheared, but in service the pressures are never sufficient to accomplish this result, and hence the small advantage gained by turning up the end of the middle tension bar to supply additional abutting surface.

But while the arch-bar side-frame is very strong in resisting a constant load, it is seriously lacking in elasticity. In the progress of the test referred to, it was found that a removal of the load did not in any case suffice to bring the structure back to its original position; the permanent set amounting to nearly or quite one-half of the original deflection. For example, when the load had been increased from zero to 50,000 lbs., the center had deflected 0.4 in., and after this load had been entirely removed there was still a deflection of approximately 0.2 in. This failure to recover is doubtless to be attributed to the character of the fastenings, for it may be said of any structure that the more rigidly the several details entering into its construction are joined the more completely it will recover its original shape after being deflected by a load. The truck frame being a loosely bolted structure, cannot be highly elastic. It is for this reason that when it fails, it does so by gradually settling until it becomes too distorted for further use, or by one of the bars breaking at the axle box as a result of repeated bending.

The facts already presented serve in part to explain the success which has attended the use of the arch-bar truck. Probably no other important detail in the make-up of railroad equipment has withstood so much severe usage and required so little attention. Of simple outline, it is easily and cheaply made. When in service its basket-like nature has permitted it to adapt itself to the inequalities of track and to absorb without detriment shocks arising from a multitude of causes. Its members are few, and besides being well placed, are held together by bolts which are of good size. The whole frame may become badly distorted and yet be serviceable. When, by reason of long service, or accident, it becomes necessary to make repairs, its form and proportions permit the work to be done with ease. In fact, the completeness with which it responds to the various demands which conditions of service impose, makes it an element in car design which, considered from a practical standpoint, is almost ideal.

On the other hand, as a structure designed to receive and to transmit loads, the ordinary arch-bar truck is not without its traces of rudeness. These the progress of the day is fast sweeping away. In the trussed, riveted side-frames now to be seen under heavy cars the parts are well joined, making the whole less flexible, but lighter and more elastic in proportion to the loads carried than the older form. Where cars are light and roads are rough, the value of the arch-bar is assured; but under the more exacting conditions of modern service, the demand for greater sustaining power and for lightness and elesticity will cause it gradually to give place to pressed plates or riveted structures.

Annual Reports.

Lake Shore & Michigan Southern.—The report of this company for the year ended Dec. 31, 1899, appears under date of May 2. The gross earnings were $23,613,946, the largest earnings in the history of the property. The net earnings were $7,781,801, and, so far as we discover, were never exceeded but once, viz., in 1880. The increase in gross, as compared with 1898, was 13.78 per cent., and in net 14.01. Interest, rentals, etc., absorbed $2,724,539, and 7 per cent. dividend took $3,462,655, leaving $1,594,607 surplus.

The earnings from freight, which were $16,115,000, increased 14.93 per cent. over 1898. Indeed the freight traffic was the largest in the history of the company. The ton-miles increased 23.19 per cent and the freight train miles 1.59 per cent., and here enters a very significant fact.

Obviously the train load must have been much greater than the year before. In fact it was 21.25 per cent. greater and reached the unusual figure of 427.3 tons. This is, of course, what we have all been look-

ing for. Only now is the Lake Shore beginning to get the real value of the famous and costly improvements in road carried out so pertinaciously by Mr. Newell. While the engines remained small the benefit of those improvements could only partly be realized. We shall look for still bigger average trains as the average locomotive and car capacity increase further. This train load of 427.3 tons is revenue freight.

The ton-miles were 3,414,880,381, and the ton-mile rate was only 0.471 cent, a decrease of 6.21 per cent. as compared with 1898. This is the lowest rate that we find in the records of the company; but, as we have seen above, it was much more than offset by the great increase in tonnage and the economy of movement. The passenger business showed a gain in volume of 14.12 per cent., in earnings of 13.26 per cent. and a decline in rate of 0.76 per cent.

The operating expenses increased 13.67 per cent. These included an extraordinary expenditure of $1,865,817 for new equipment and $234,000 for various construction. Nothing has been charged to construction or equipment since 1883, and the report still says "the capital stock of the company has remained unchanged since 1871, 28 years." Recent operations have increased the funded debt $4,046,000, but reduced the yearly interest charge $815,325.

Freight Car Loading.

The better loading of freight cars is being studied in a pretty systematic way by many roads and much attention is given to this question on the Union Pacific. Before much can be done in the way of improvement, it is necessary to know definitely how nearly cars are loaded to full capacity, and this information is afterward needed as a check on the work. On the Union Pacific, considerable improvement has been shown in the loading of cars as the result of the officers having each week information of this kind, as given by reports started a little over a year ago. A report of the cars loaded and cars received from connections is made weekly by all station agents to Division Superintendents. Each Superintendent then makes a report for his division which is sent to the Superintendent of Transportation; and he in turn compiles a statement, or summary, covering the whole system and sends copies of this, together with the division reports, to all officers concerned. In this way attention is constantly directed to the loading of cars and a poor showing is made the subject of investigation.

For this report a printed blank is provided having two sets of columns, one for cars loaded at stations and one set of columns for cars received from connections. The column headings are alike for both sets and are: Number of cars loaded; dead weight of cars, total and average; capacity of cars, total and average; weight of contents, total and average; the percentage of load to capacity and the percentage of dead weight hauled. In reporting, the cars are grouped according to their contents, a line each being used for: Coal, corn, hay, lumber, ties, etc.; merchandise; mill stuff; ore, lead and bullion; other grain; perishable freight; potatoes; stock; stone, sand and gravel; wheat. Other loading is grouped under miscellaneous. Space is provided for column totals, and the following lines are respectively totals for the same week of the previous year, increases and decreases, and similar data regarding the same week of the previous month.

The preparation of these reports is said to require little extra work and they have been the means of bringing about such important changes in the loading of cars, that now cars loaded on the home road almost invariably show a greater percentage of load to capacity than cars received from connections.

The New York Central has a strike of car repairers at Buffalo. About 900 men—say nine-tenths of the force—went out on April 26, and at the present writing they are still out. On Monday of this week some freight handlers in the same city struck. According to the reports this second strike has no direct connection with the repairers' strike. It does not appear how extensive it is or whether it has caused much delay to freight, but it is said to have been joined by men in the transfer houses of all the roads in the city. The car repairers demand an increase in their pay, the recognition of their union, including permission for union "agents" to have free access to the shops in working hours, and an agreement that when work is slack the hours shall be reduced so that all of the men can be kept at work; and, finally, the union men want to be consulted whenever any man is employed or dismissed. Less than two months ago the company voluntarily increased the pay of these men ten or twelve per cent.; but notwithstanding this fact, the officers now say that they are willing to consider any question of wages that the men may wish to present; and it is not unlikely that conferences on his point may settle the strike before these lines reach the reader. On the other points the road is, of course, firm in its refusal to negotiate. In the matter of reducing hours in dull seasons President Callaway, speaking to a reporter, very bluntly says that a reduction of the force at such times is the legitimate opportunity to get rid of the less efficient workmen, and that the company will not give up this right. Moreover, a general reduction of hours is followed by resignations among the more competent men, who get better jobs elsewhere. This is only plain commonsense; but it is a truth that is not often clearly stated, and Mr. Callaway is to be commended for putting it in plain English.

The Mexican Central Railway has done more than any other one agency, perhaps, to develop the great and peculiar country in which it has built, but has not yet proved very profitable to its proprietors. While its mileage has increased one-ninth since 1892, its gross earnings have nearly doubled. They are still light, however; last year $7,889 per mile in Mexican currency, or about half as much in gold. The net earnings in our currency were $2,517,000, which is but 2.57 per cent. on the $96,500,000 of bonds outstanding, not to mention the $48,000,000 of capital stock. The company has done one notable thing in building a harbor at Tampico which has very greatly affected Mexican commerce. Harbors have been built before, but commerce has a way of seeking familiar ports. Heretofore Mexico can hardly be said to have had more than one Gulf port. Nearly all imports came in at Vera Cruz. Last year 328,779 tons were imported there and 382,319 tons at Tampico, and in every year since 1895 Tampico has had the larger tonnage of imports. The old port, however, holds on to the valuable merchandise, as is the way of old ports, and the total value of the imports at Vera Cruz was 21 millions, against 8 millions for the larger tonnage at Tampico. As for exports, in weight they are what we would call insignificant—last year 130,898 tons at Tampico and 69,769 at Vera Cruz. A considerable part of the exports consists of bullion, and the average value per ton of those from Vera Cruz was more than $200. The exports through El Paso were nearly 40 per cent. greater in weight than those through Tampico, but little more than a third as much in value. In spite of the development of the harbor of Tampico, both exports and imports at Vera Cruz were much larger last year than ever before.

A press dispatch from Washington of Monday last says that the United States Supreme Court, in a decision by Justice Brown, has decided that the Illinois law requiring passenger trains to stop at all county seats on their respective routes is invalid. The case at issue involved the right of the Cleveland, Cincinnati, Chicago & St. Louis to run the Knickerbocker special, a through train from St. Louis to New York, without stopping at county seats. In the Illinois Supreme Court the suit was declared in favor of the State, but the present opinion reverses that judgment, on the ground that the law in this case is a direct and unnecessary burden on interstate commerce. In a Minnesota case, decided April 12, 1897, the Supreme Court sustained a law requiring stops at county seats, but the suit concerned a train which began and ended its trip within the State (though it carried interstate passengers). It will be recalled, also, that the Supreme Court last year sustained the Ohio train-stopping law. (See Railroad Gazette, pages 176 and 330). This law was made for the benefit, not of county seats, but of all villages of over 3,000 inhabitants. It required at least three trains each way every day (or all the trains if less than three were run). The Court sustained this statute on the ground, chiefly, that the restriction on interstate commerce was, at the worst, only incidental; and practically told the road (the Lake Shore that if it wished to run fast through trains it must have more than three trains a day. This decision, however, was adopted by a vote of 5 to 4, and it would appear that the strong minority has now been changed to a majority. The C., C., C. & St. L. made a forcible plea that the Knickerbocker "special" was, in fact, a special train which had been put on to accommodate through business; and this plea seems finally to have prevailed.

NEW PUBLICATIONS.

The Technic of Mechanical Draughting. A Practical Guide to Neat, Correct and Legible Drawing. By Charles W. Reinhardt. New York: The Engineering News Publishing Co., 1900. Price, $1.

Mr. Reinhardt in his preface says that he has prepared this book to give the busy draughtsman a practical and common-sense guide to good mechanical draughting, paying no attention to the mathematics. He points out that it is a common error of draughtsmen to fail to execute their drawings in such a way as to make them easily read. It is his purpose to show what is required in practice and the easiest way of filling such requirements. He does not undertake to prepare a manual for beginners, but to give hints for those who are already familiar with the mathematical principles of mechanical draughting, to help them to produce neat, correct and legible drawings. In brief, Mr. Reinhardt's little book is designed to do for the draughtsman exactly what a skillful and experienced instructor could do for him by standing over the work and pointing out the short cuts and the effective methods that can only be learned by practice. All of this we judge the author has succeeded in doing.

Problems in Machine Design. By Charles H. Innes, M. A., Engineering Lecturer at the Rutherford College, Newcastle-on-Tyne. Second edition. Manchester: The Technical Publishing Co., Limited. 1899. $2.

This is a book for a small and special class, and not for the general reader of works upon kindred topics. The treatment is almost exclusively analytical, and frequently so condensed as to be obscure rather than explanatory. As the author states in his preface, the book is intended for the use of students preparing for the "Honours Stages" of certain technological examinations. Such of those students as have all their higher mathematics and applied mechanics at their fingers' ends, may perhaps read this treatise to advantage; but even they will find their task made much more difficult than it need have been because of the imperfect nature and defective lettering of the diagrams. These, in fact, could hardly have been made worse.

TRADE CATALOQUES.

The Torrey Ballast Car.—The Q & C Co. sends us a pamphlet calling attention to the system of loading and distributing gravel and stone ballast designed and developed by Mr. A. Torrey, Chief Engineer of the Michigan Central RR. The cars designed by Mr. Torrey are protected by patents issued to him Jan. 2, 1900, and the Q & C Company has made arrangements to grant licenses to railroad companies and contractors to make or use cars built under these patents.

Mr. Torrey's scheme (see Railroad Gazette, Oct. 13, 1899, p. 707) is to permit ballast to be delivered by regular way freight trains at small cost for transportation and unloading. It is delivered at the sides of the track by side-dump cars provided with two sets of doors on each side an inner and an outer set. The doors are so arranged that sufficient ballast is carried between the inner and the outer doors to raise the track about eight inches, for the length of the car, and the same amount is contained above the inner doors. In operation several cars are attached to a train and dumped by the train hands. A loading machine, which can be pushed by four or five men, is a part of the system. This consists of a light car with two belt conveyors driven by a gasoline engine and carrying a framework to which grain scoops are hung by ropes. By hanging the shovels in this way each man accomplishes the work of three using ordinary hand shovels. The material is shoveled into hoppers and elevated to the cars by the conveyors.

The Sargent Company, Chicago, has issued a 6 x 9-in. pamphlet illustrating various designs of cast steel locomotive driving wheel centers. In the the preface it is said that these correspond to wheel centers for which it has patterns, representing the practice of different railroads and showing the wide difference of opinion existing. From several years' experience in making cast steel wheel centers, the Sargent Company strongly advises that the hubs and counterbalances be made solid and that the rims be split; that better castings can always be expected where cores are not used. They are prepared, however, to furnish castings in accordance with any design which a railroad may choose to submit. The engravings are from full-dimension drawings and show the principal sections and the weights of the finished pieces, so that the book is a particularly useful one for designers.

Gages, Indicators, etc.—The Ashcroft Manufacturing Co., 85 Liberty St., New York City, sends us its catalogue for 1900, dated Feb. 1. It is an octavo volume of 166 pages, with index, substantially bound. The variety of gages is great, covering all usual and some unusual applications. Besides, the catalogue shows revolution counters, watchmen's clocks, indicators, pyrometers and a special line of pipe fitters' and machinists' tools. The catalogue is well illustrated and contains descriptions of the apparatus.

Hints on Painting Structural Steel. By Mr. Houston Lowe, of Lowe Brothers Co., Dayton, O. This is a handbook for painters in which Mr. Lowe has given information collected during a long experience as a paint maker. The first chapter is a discussion of the theory of paints and the features for a good metal covering. Special attention is given to the subject of cleaning and painting steel surfaces, and much information is given of use to paint users.

Wood Preservation.—The Barschall Impregnating Co., 31 Nassau St., New York City, sends us a little pamphlet of 32 pages entitled "A Treatise on Wood Preservation." This pamphlet is made up of descriptions of the Hasselmann system of impregnation and accounts of experience with this system, all of which material is taken from addresses and reports by various German specialists and students.

Old Norris Freight Engines on the Pennsylvania Railroad.

By C. H. Carruthers.

In February and March, 1854, Messrs. R. Norris & Son of Philadelphia built two freight engines for the Pennsylvania Railroad and named them Kittatinny and Allegrippus. When numbers took the place of names in 1857, the Kittatinny became No. 92 and the Allegrippus became No. 96.

The principal dimensions of these engines were as follows:

Cylinders	17 in. x 22 in.
Drivers, diameter	44 in.
Leading wheels, diameter	30 in.
Wheel base of drivers	96 in.
Total wheel base	11 ft. 3 in.
Boiler, length over all	20 ft. 10 in.
" diameter	44 in.
" center above rail	5 ft. 3 in.
" type...Flush top to firebox, thence to rear, sloped downwards somewhat like a Winans "camel"	
Firebox, length inside	5 ft. 6 in.
" width "	2 ft. 9 in.
Weight on drivers	43,800 lbs.
Total weight	55,600 lbs.
Fuel..Coal on road; and coke in yard and street service	

The arrangement of driving wheels set close together; single pair of leading wheels in rigid jaws close in front of drivers; and all wheels between firebox and cylinders; one large half-elliptic spring on each side with ends bearing on posts resting on boxes of second and third pairs of drivers, and another large half-elliptic spring on each side with ends on posts resting on boxes of first pair of drivers and boxes of leading wheels; pump behind rear drivers, and driven from wrists attached to the rod pins on rear drivers; single diamond-bar guide; cross heads, and pitch of cylinders; all were close imitations of the design followed by Smith & Perkins of the Virginia Locomotive Works at Alexandria in ten engines built for the company during the year preceding the building of these Norris engines.

The boilers differed considerably from those of the Perkins engines in having greater diameter and less length of barrel, and longer firebox with sloping top.

The Perkins engines used drop hooks of the "D" type controlled by "half-moon" segments on reversing shaft; but these used Norris' "V" hooks, single on full-stroke gear and double on cut-off gear.

Fig. 1 shows the type used. Full-stroke hooks W′ W″ were attached to tumbling shaft T by curved pieces BB′ and CC′ and operated by reversing arms R R‴ R‴ attached to frame by Journal at S and connected to tumber T′ T″ at V by rod Y V.

The cut-off valve was placed on the top of full-stroke valve. Its rod B worked in a guide J attached to main valve rod. At I″ on cut-off rod, a pin was fastened which carried one end of a rod E. This rod was attached at I to the controlling gear from the cab, and just beyond I it ended in a double "V" hook. When in gear the hook G of this part was held by the controlling gear, L M N O & P, on the pin H′ at top of cut-off rocker D, and when out of gear the lower hook G″ was held upon a pin H″ which was fastened upon the main valve-rod A, allowing the cut-off pin H′ to move to and fro in the space between the hooks G′ G″.

An old lithograph of these engines shows a peculiar design of valve gear which probably never was constructed; as it was not on the two here described, nor do a number of old enginemen who were very familiar with Norris engines of that period recall having ever seen it used on any engine.

Fig. 2 shows it. The full-stroke gear is the same as No. 1, except that it is worked upon the rocker nearest the cylinder instead of that furthest out.

The cut-off valve-rod is hinged at I″ and guided at J, about as in the other type, but at its outer end it carries two single "V" hooks, one G′ close to the end which engages pin H′ and cut-off rocker D when rod is lifted, and another G″ which engages pin H″ on rocker of full-stroke valve. The controlling gear is bracketed to top of boiler at P. The lithograph referred to shows outside of steam chest lining parallel to center line through all drivers, but valve-rods inclined slightly upward toward the cab; which would indicate a valve seat at an angle different from either that of the cylinder or of the exterior of the steam chest. The object was doubtless to obtain room for rockers between the drivers; but this room was obtained in the type used, without the pitch of valve, by use of curved rockers; and boxes set well in on the frames.

The firebox extended to the back of the cab; which was somewhat rare practice at that time.

The tenders were of ordinary type, a little longer at the front to give better space for firing; and the tender trucks were of a side bearing type having the boxes bound together by bars at top and bottom

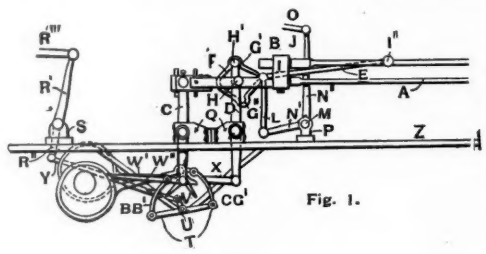


Fig. 1.

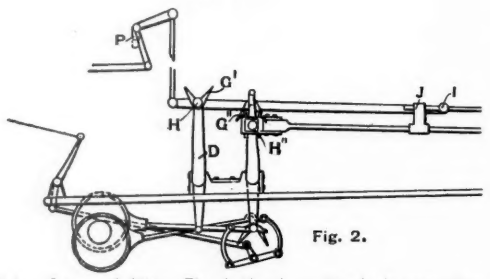


Fig. 2.

Valve Gears of 1854—Fig. 1, Used on Norris Locomotive; Fig. 2. Proposed Design.

and large inverted half-elliptic springs as shown with their ends resting in pockets on top of the boxes, and their centre-band in a seat on tender frame.

Tenders, cabs, sand-boxes, and wheels were all painted green.

The name was on a plate of brass on side of boiler; and the builders' plate was shield shape. The construction number I have forgotten, but know certainly it was between 650 and 700, as engine Loyalhanna, built by Messrs. Norris for the P. R. R. in October, 1853, bore construction number 649.

About 1857 these engines received general repairs in the Pittsburgh shops, but the only change noticeable was moving of the sand boxes to the front end of the boiler, and the bell to the place formerly occupied by the sand box. New cabs, somewhat higher and having four panels under the windows, were also put on at this time; and the names were removed.

In 1859 these engines were leased to the Steubenville & Indiana, now a part of the P., C., C. & St. L., on which road they remained until worn out.

The greater part of their work on the Pennsylvania was in service as shifting engines in the Pittsburgh yard, although at first they did some through service; and in the same month in which it came on the road, the Allegrippus figured in an accident which was probably the first of any moment on the mountain after the opening of the present route across the Alleghenies. At a point about three miles above the Horseshoe Bend (Kittanning Point) the newly made embankment gave way, and the engine fell forty feet down the side of the embankment. Engineman Thomas Ridley was badly injured. He ever after referred to the scene of the accident as Allegrippus, and when in after years the company established a station at the place it was named Allegrippus, which name it still bears. Mr. Ridley is still in the active service of the Pennsylvania Railroad as one of the assistants to Mr. J. K. Russell, road foreman of engines of the Pittsburgh division. He carries a handsome gold watch bearing an inscription reading: "Presented to Thomas Ridley by the Pennsylvania Railroad Company for bravery in holding his train in the face of an armed mob, on the night of July 22, 1877." By the act referred to he saved his train of Pullmans, day coaches, postal cars and Adams express cars with valuable cargoes, from destruction in the fires of the historic riots of 1877.

For courtesies which assured the accuracy of this article, the reader should thank Messrs. Ridley and Russell.

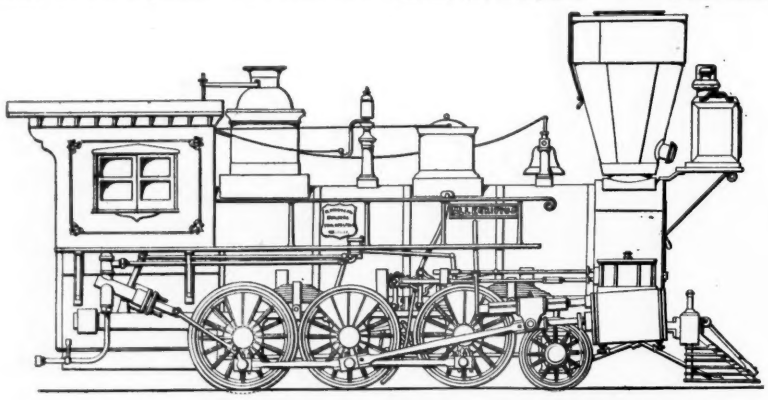


Fig 3.—Norris Locomotive, Pennsylvania Railroad, 1854.

Corrosion of Locomotive Boiler Tubes.

An interesting case of boiler-tube corrosion is reported by H. Baucke, of Amsterdam. Some of the tubes of a new locomotive became leaky, and it was found that small circular or elliptical holes had formed on the outside of the tubes. The holes were arranged in straight lines, parallel to the axis of the tube. The analysis of the water did not disclose any peculiarities, no scale had been deposited, and some of the original tubes were found in good condition after two years' service. The fault, therefore, appeared to rest with the material of the tubes—mild steel. The analyses of the corroded and the intact materials, which we will call bad (B) and good (G) for brevity's sake, yielded the following results:

	G.	B.
Carbon	0.106	0.033
Sulphur	0.024	0.057
Phosphorus	0.093	0.017
Silicon	0.061	0.009
Manganese	0.19	0.351

The carbon percentage of the bad steel is low, but not abnormally so, nor are the other figures characteristic. The usual mechanical tests were applied with satisfactory results. But when Baucke polished small pieces of bad steel in accordance with the Behrens test (grinding and polishing successively on glass, tin and celluloid), small crystals detached themselves from the outer surface. This brittleness was confined to the one surface layer of the bad steel, and disappeared when that outer surface had been filed down. Microscopic examination revealed, in the corroded spots, the presence of comparatively large crystals and of many fissures at right angles to the longitudinal axis of the tube, i. e., to the direction in which the tube had been rolled. The corrosion appeared to start in those fissures, in which water, steam and air would penetrate and cause disintegration.

Baucke further noticed peculiar grooves on the outer surface of the bad steel, again axial in direction. These grooves he ascribes to the flattening out, during the process of rolling, of occluded carbonic oxide. The gas might have been present, together with the other structural defects, in the original material, or might have developed during the repeated annealing and rolling of the tubes. Both defects would escape detection by the ordinary mechanical and chemical tests, and be disclosed only by microscopical examination.

In this recommendation of microscopical tests most metallurgists will entirely concur. But Baucke's explanations are not unimpeachable. From his own arguments one would rather expect to find marks of irregular outlines than the circular and elliptical holes which he describes. The publication of Baucke's paper has induced a correspondent of Stahl und Eisen to draw attention to a somewhat similar observation. Mild steel boiler tubes have been used for locomotives both at Cologne and at Frankfurt-on-the-Main. At the former place, the tubes have always answered very well; at the latter place some of the tubes, which were all of the same material, have shown corrosion. It appeared that at Cologne the tubes were carefully scoured with soda before use, and after any repairs in the firebox. When this scouring was adopted at Frankfort, the trouble on ceased. The corrosion is ascribed to drops of oil which had accidently fallen on the tubes. Such oil spots would lead to corrosion marks, round in outline, as in Baucke's case, but the marks should be arranged in rings rather than in the parallel straight axial lines of which Baucke speaks, and the analogy, therefore, seems to fail.—Engineering.

Demand for Rails and Railroad Materials in Mexico.

It is estimated that there are over 8,000 miles of public railroad now in operation in the States of Mexico. In addition to this there are more than 54,000 miles of private track, owned by planters and mining companies. A Mexican correspondent of the Philadelphia Commercial Museum writes that there is a demand in the country for portable rails for plantations, etc., and that this is especially felt in the State of Campeche.

In the State of Coahuila a standard gage railroad will be built by the Conquista Coal Company, some of the members of which are Messrs. James T. Gardner and Howard Dutcher of 21 Cortland St., New York City. The Mexican Coal & Coke Co., of Mexico City, also will build several short lines of railroad in and about the coal fields in this State, the principal line running from Baroteran, on the Mexican International, to Musquiz, situated in the coal section. Lines will also be run from Baroteran to San Pedro, on the Mexican Central, or some close-by point, and from Baroteran to Lampazos, on the Mexican National. The lines will be narrow gage, but will have a third rail for standard gage.

In the State of Michoacan, Señors Luis G. Ramirez and H. Heredia, of La Piedad, will build a road from La Piedad to La Piedad Cabadas, 12 miles, on which animal traction is to be employed at first.

The Green Consolidated Copper Co., with mines at La Cananea in the State of Sonora, will build a standard gage line from Naco, on the Arizona-Sonora Short Line, to its mines, about 41 miles.

In addition to these mining roads some of the large railroad companies are now either engaged on, or project extensions, such as the Mexican Central, standard gage, which will soon start work on a line

from Guadalajara to Colima, a distance of about 162 miles, and the Vera Cruz & Pacific, which will extend its main line from Papaloapam to Santa Lucrecia, 128 miles, with two branches, one of 71 miles to Vera Cruz and the other of 62 miles to Oaxaca. The Mexican Southern Railway (3 ft. gage) has decided to adopt steel ties for its entire system of about 228 miles. The National Tehuantepec, which has been leased from the Mexican Government for 50 years by Sir Weetman Pearson, of 16 Carlton House Terrace, London, W., is now being thoroughly equipped and in some parts is being entirely rebuilt. The road is 192 miles long and is 4 ft. 8 in. gage. It is also rumored that Sir Weetman will take over from the Government the Chiapas RR., and will put it in first class condition.

Should the project for building a railroad to connect the four States of Yucatan, Campeche, Tabasco and Chiapas, about which there has been so much discussion among the authorities of the states interested, be put through, it will require rails for about 410 miles. Hon. Santiago Mendez, the Assistant Secretary of the Department of Communications, estimates that the road will cost about $14,000,000. The Federal Government will grant a subsidy of $6,000,000, and the several States are also expected to support the road by subsidies.

It is stated that the Government will more than likely approve the plans submitted by Porfirio Diaz, Jr., son of the President of the Republic, for building the Southwestern railroad system in the State of Yucatan. As far as is known this new road has not yet opened offices in Mexico City, but in all probability it will. It is believed that Capt. Diaz will attend to the buying of the material for the road.

That this country obtains a large share of the trade is evident from the following statistics of the exports of rails, sleepers, etc., of Great Britain, Germany and the United States, the three countries which almost entirely supply the demand:

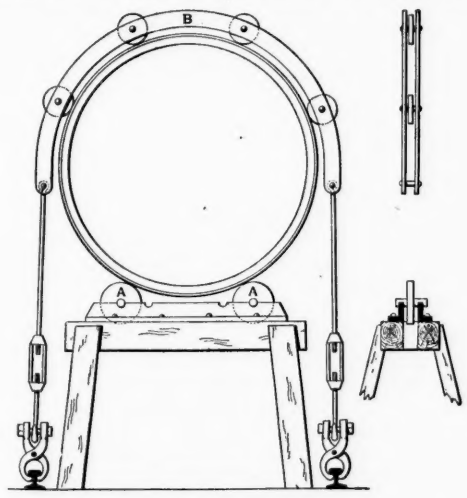
1898.	U. S.	G. B.	Ger.
Rails, sleepers, etc....	37,731 tons	8,923 tons	697 tons

The following firms and individuals in the City of Mexico are either importers of rails or are connected with railroads, which are large buyers of rails, railroad materials, etc., and it would be advisable for American manufacturers of such to open up correspondence with them:

J. Arce & Co., 1ade San Francisco, 1.
Roberto Boker y Ca., Puente del Espiritu Santo, 4.
Sebastian Camacha, S. Fernando, 38.
Thomas Detweiler, 2 Laragaza, 1.
Warren Garrett, San Juan de Letran, 4.
J. H. Hampson, Calle del Eucino, 505.
Carlos Linder(Sus. Luis Anciaux y Cia), Tarasquillo.
Rudolph Peyton y Cia.
Sommer, Herrmann y Cia., Ocampo, 1.

Roller Blocking for Boilers.

The device shown in the accompanying illustration is used at the Kingsland shops of the D., L. & W. R.R. Instead of blocking the boiler up as is usually done, it is placed on two horses having rollers, AA, on the top, as shown. Two of these horses are used, one under the front end and the other just forward of the firebox. The yoke, B, which is fitted with rollers, is placed around the top of the boiler directly over the horse which supports the front end. This yoke is attached to the track, as shown by the



Roller Blocking for Boilers.

hooked rods, turn-buckles and clamps. When the clamps are adjusted to the track, the yoke is tightened around the boiler by turning the turn-buckles. This device was designed to avoid the awkward job of working on the boiler from underneath. In using it the boiler can be placed in any position desired, thus enabling the boilermaker to work faster and with more ease than he could from underneath. The boiler is kept from turning when put in the desired position for working by two pieces of flat iron; one bolted to each side of the firebox and extending to the floor.

TECHNICAL.

Manufacturing and Business.

A. W. Brown, formerly Vice-President and General Manager of the Cambridge Iron & Steel Co., Cambridge, O., and now General Superintendent of the American Sheet Steel Co., has opened offices in the Vandergift Bldg., Pittsburgh.

The New York offices of the Detroit Graphite Mfg. Co have been moved to the Washington Life Building, 141 Broadway, where more central and more commodious quarters have been secured.

The Standard Railway Equipment Co. has moved its New York offices to Beard Building, 122 Liberty Street.

Frank W. Thomas who, for several years past, has been inspector and engineer of tests for the Norfolk & Western, has accepted a position with Fitz-Hugh & Co., Chicago, dealers in railroad equipment.

The Chicago office of the Pickering Spring Co., Ltd., has been moved from 517 Monadnock Block to 209 Great Northern Building.

T. P. Kimman, Assistant Mechanical Superintendent of the Standard Pneumatic Tool Co., of Chicago, has sailed for Paris to install and operate "Little Giant" pneumatic tools at the Paris Exposition. The company will have a complete air plant in operation.

Sidney H. Wheelhouse, formerly sales agent for the Chicago Pneumatic Tool Co., has been appointed Second Vice-President of the Standard Railway Equipment Co., in charge of the pneumatic tool sales department for the West, with offices at Lincoln Trust Building, St. Louis.

Frederick Schoff, proprietor of the Stow Flexible Shaft Co., reports a steady and constantly growing demand for its electric portable drills, and that an order has just been received from the United States Navy Yard at Port Royal, S. C., for three of the largest. In addition orders are booked for a number of crank pin turners, boring bars and planers. April shipments include boring bars, planers and crank pin turners to St. Louis; boring bars to Michigan; electric portable drills to Brooklyn, N. Y., also to Portland, Me. Several electric portable drills are about ready for shipment to Paris, France, as are also boring bars for Russia, to be used for cutting up hogs.

J. G. Miller, Security Building, St. Louis, Mo., has been appointed sales agent for the Pennsylvania Steel Co. at that point.

The Standard Tool Co., of Cleveland, O., has shipped to the Paris Exposition an attractive exhibit, consisting of two cases containing a variety of tools finished for actual work. The larger case is pyramidal in form, inclosed in plate glass, resting on a base of rosewood and black marble. On one side of the pyramid the trade mark of the company—a shield bearing its name—is worked out in small tools and surrounded by various sizes of drills. On the other sides are displayed reamers, arbors, taps and milling cutters, about the base being a variety of mandrels, chucks, drills in sets and large drills, as well as a number of special tools, not ordinarily listed. The other case, which is three-cornered, is almost wholly of plate glass, resting on a marble base, and contains drills, milling cutters and reamers.

Patrick Kennedy has been appointed Chief Engineer of the Consolidated Railway Electric Lighting & Equipment Co., with office at 22 Thames St., New York City. Mr. Kennedy is well known in Brooklyn as a mechanical and electrical engineer and was owner of the Kennedy Machine Works of that city, now a part of the Consolidated Railway Electric Lighting & Equipment Co. Mr. Kennedy is the inventor of the basic gears applied to the company's system of lighting cars.

Iron and Steel.

The extensive and old-established steel plate and ironworks of Senores Duro & Company, of La Felguera, Asturias, Spain, have been transferred to a private company, now styled "La Sociedad Anonima de la Felguera," with a capital of 13,000,000 pesetas. The object of the company, according to the Journal of Commerce, New York, is to acquire more coal and iron ore mines, increase the output for exportation, build new furnaces and coke ovens, and develop to the fullest extent the manufacture of steel plates and merchant iron, for which an entire new plant will be necessary. Applications should be made to Senor Director de "La Sociedad Anonima de la Felguera," Asturias, Spain.

The Lackawanna Iron & Steel Co. has moved its offices from 52 Wall St. to 100 Broadway, New York.

The Missouri Valley Bridge & Iron Works of Leavenworth, Kan., has recently finished a steel bridge of two spans over the Balsas River, Mexico, for the Mexico, Cuernavaca & Pacific Ry. One span is 250 ft. and the other 130 ft. The cost was $120,000.

The Alabama Steel & Wire Co., whose wire, rod and nail mill at Ensley, Ala., were recently put in operation, has announced a cut in the prices corresponding with the reduction made by the American Steel & Wire Co.

W. S. Grammer, heretofore with the Colorado Fuel & Iron Co., has been appointed Superintendent of the Newfoundland mines of the Dominion Steel Co. Co. of Nova Scotia.

F. L. Grammer, for four years in charge of Lackawanna furnaces and interests in Lebanon County, Pennsylvania, has resigned to become Superintendent of the American Steel & Wire Co. furnaces in the Cleveland district, Ohio.

The Howard Axle Works of the Carnegie Co., at West Homestead, Pa., were put in operation April 23. This is the largest axle plant in the world. It will have a capacity of 280,000 axles a year. The main building is 1,000 ft. long and 150 ft. wide. J. B. Hardie, heretofore of the Engineering Department of the Carnegie Steel Co., Ltd., is General Superintendent of the axle works.

Alabama advices state that a Glasgow, Scotland, firm has placed a large order in the Birmingham district for Alabama pig iron.

The Morgan Construction Co. of Worcester, Mass., has an order from the Carnegie Steel Co. for two billet mills and a merchant mill for the extensions to the Carnegie works at Duquesne. The contract is worth nearly $500,000.

Wm. M. Gaylord, at one time Vice-President and Treasurer of the Detroit & Lake Superior Iron Mnfg. Co., now known as the Gaylord Iron Co., died at Northampton, Mass., April 21, at the age of 77.

Oliver Phelps of Detroit, Mich., formerly with the Michigan-Peninsula Car Co., has become General Manager of the Lorain Foundry Co., Lorain, O.

A correspondent in South Africa informs us that the great highway bridge over the Orange River five miles from Donkerpoort, S. A. R., which was destroyed March 8, was supposed to have cost £43,000. The bridge consisted of 12 spans, each 150 ft. wide. Three of the 12 spans were blown up by dynamite.

Among the bills recently passed by the House of Representatives is one authorizing a bridge across the Red River of the North; also authorizing the Carolina Railway Co. to build a bridge across the Lumber River, N. C.

The independent producers of pig iron of the Shenango and Mahoning valleys and of the Pittsburg district, in conjunction with the Bessemer Pig Iron Association, at a meeting in Cleveland, April 28, decided to maintain the price of pig iron at $24 a ton for the remainder of the year.

Tracklaying Machine.

The Union Pacific is now building at the Omaha shops a track-laying machine according to plans of the Roberts Steam Track Layer Company, of Seattle, Wash. The apparatus consists of a long flat car on which is mounted a small stationary boiler and engine for driving two long conveyors, one on either side of the car. These conveyors extend at least two car lengths in the rear and project well beyond the front end of the car, which is made to follow up the track-laying gang. Rails are unloaded from a car into the conveyor and are carried forward to where the track is being laid; in the same way ties and other materials are forwarded by the opposite conveyor, and the object is to save labor in transporting materials where single track lines are built. Similar apparatus is said to have given satisfactory results on the Northern Pacific Railway.

Tests of Cement.

In the April Proceedings of the American Society of Civil Engineers is a progress report from the special committee on the "Proper Manipulation of Tests of Cement," Prof. George F. Swain, Chairman. The committee sent out a circular asking a number of questions (about 75, we believe). Replies to the circular were received from 45 persons, of whom 36 belong to the Society. In the opinion of the committee, the number of replies does not appear to show a very general interest in the subject, and the replies themselves differ so greatly that they do not justify formal recommendations. The committee presents a summary of these replies, which is published in the April Proceedings. It would be impracticable for us to attempt to give any comprehensive statement from this summary, but it is a document which should be read by those interested in cement tests.

Engineering Tests.

Strength of annealed and unannealed chains.—The first of a series of tests to determine the relative strength of wrought iron chains, annealed and unannealed, was recently made at Stevens Institute by Messrs. E. N. and A. J. Wood, graduates of the Institute. A note on the work may here be made as an introduction to a further report which will be given later if subsequent tests are satisfactory. The test was made for a well-known wrecking and dredging company which has had considerable annoyance from the breakage of chains, usually due to a jerk on the chain when heavily loaded. Test specimens from a broken chain were taken from the sides of a link next to one that broke and one of these was annealed. The two test pieces were turned to .62 in. in diameter for exactly four inches. When put under tension, the unannealed specimen

showed that the total elongations were not proportional to the load. This piece did not break in the reduced section, but pulled apart at 45,000 lbs. per sq. in. at the ends along the line of the weld, which was in a bend of the link. The broken specimen showed a very imperfect weld, there being a section about ¼ in. wide by 1½ in. long where the metal did not come together. The annealed specimen did much better than the other, although it gave a rather low tensile strength. It elongated uniformly and broke at 47,000 lbs. per sq. in. Both specimens showed a coarse, fibrous structure and with the exception of the flaw referred to, the indications were that the metal was excellent. On account of the defect in the unannealed specimen, the test failed to indicate anything as to the effect of annealing, but it did show poor workmanship in welding the chains, and of careless engineering in permitting a chain to pass which was welded on the bent portion. If other tests to determine the effect of annealing links have been made, the Railroad Gazette would like to learn what conclusions were reached.

New York State Canals.

Arrangements are making for the survey for a barge canal through New York State, for which $200,000 was appropriated by the Legislature. A board of engineers has been appointed as follows: George S. Morison, New York; Major Daniel C. Kingman, Corps of Engineers, U. S. A.; Prof. William H. Burr, Columbia University; Major T. W. Symons, Corps of Engineers, U. S. A., and Elnathan Sweet, Albany.

Ball Bearings for Hand Cars.

We are informed by the Sheffield Car Company, of Three Rivers, Mich., that now the main riding wheels of the Sheffield velocipede car are equipped with ball bearings. The company has experimented a good deal and has settled on a ball bearing in which it has confidence and all velocipede cars made by it hereafter will be so equipped.

The Quebec Bridge.

The contract which the Phoenix Bridge Co. has with the Quebec Bridge Co. for the superstructure of the proposed bridge over the St. Lawrence River nine miles above Quebec is based on a sliding scale dependent on the market price of steel when the work shall be built. The bridge will require about 27,000 tons of steel. So far as the plans have been decided, the bridge will be 150 ft. above the river and will be 67 ft. wide. The bridge proper and approaches will be nearly 3,300 ft. long. The middle span of the cantilever will be about 1,800 ft. The two end spans are each about 500 ft. long and 84 ft. deep at the ends. The middle span will be the longest of the kind in the world, exceeding that of the Forth Bridge in Scotland by one hundred feet. The bridge will carry two steam railroad tracks and two electric railroad tracks, a roadway, and walks. It will require about two years to finish the foundations, the contract for which, as already noted, has been let to William Davis & Son of Cardinal, Ont., and the steel work need not be begun for 18 months. Mr. E. A. Howe of Quebec is the Chief Engineer, and Mr. Theodore Cooper of New York is Consulting Engineer.

THE SCRAP HEAP.

Notes.

At Buffalo, N. Y., last week about 200 brasses were stolen out of freight cars in the yard of the Lehigh Valley road, all at a single haul, in one night.

Thomas J. Hunter, formerly Auditor of the Atlanta & West Point, has been sentenced at Atlanta to five years' imprisonment in the penitentiary for embezzlement.

Near Higginson, Ark., at 1 o'clock on the morning of April 27, a single negro robber "held up" a passenger train of the St. Louis, Iron Mountain & Southern and took most of the money of all the passengers in the day car and one sleeping car.

The Baltimore & Ohio is to exhibit at the Paris Exposition a large collection of pictures of its cars, engines and works, also views of scenery along the line. These pictures are to appear in the American Building in the Department of Education and Social Economy.

The Colorado & Southern has introduced "record discipline," and suspensions from duty were discontinued on May 1. Provision is made for cancelling demerit marks by subsequent satisfactory service. A perfect record for one year cancels a "suspension" of 30 days.

The Central Passenger Association offers a reward of $500 for the conviction of any person fraudulently stamping or dating certain round-trip tickets. This offer is designed to put a check on scalping at the large conventions to be held this summer. Engravers and stamp makers have been notified that the Association has ordered all the stamps and dies that it will need.

The Supreme Court of Michigan, in a suit brought by the State Railroad Commissioner, has decided that the Wabash road must reduce its passenger fares in that state to the basis of 2.5 cents a mile. By the law of 1891 a railroad whose passenger earnings are over $2,000 a mile must carry passengers at this rate. The road has refused to reduce its fares from the basis of three cents, claiming that the earnings from baggage, express and mail ought not to be included in making up the total of the passenger earnings, but the Supreme Court decides that these amounts should be included.

The Senate Commerce Committee has reported the Cullom bill with the recommendation that it be rejected; the Senate, however, has not yet ordered the bill laid aside, but has placed it on the calendar where it may be called up the same as though it had been favorably reported. The vote in committee against the bill was 5 to 4. The four Senators who voted for the bill were Messrs. Cullom (Rep., Ill.), Chandler (Rep., N. H.), Allen (Pop., Neb.), and Tillman (Dem., S. C.), and those who cast their votes in the negative were Messrs. Gear (Rep., Ia.), Elkins (Rep., W. Va.), Wolcott (Rep., Ia.), Kean (Rep., N. J.), and Lindsay (Dem., Ky.).

By the new timetable now in effect one of the trains between Boston and Chicago over the Boston & Albany, the New York Central and the Lake Shore, runs through each way in 26 hours, which is an hour and a half less than the present time, and 35 minutes shorter than the time of the fastest train heretofore. The Southwestern Limited, leaving New York at 1 p. m., no longer has a Chicago connection, a new Chicago train leaving New York at 2 o'clock. This train reaches Chicago at 4 p. m. The Boston train which has been made faster is No. 15. Train No. 23, leaving New York and Boston in the evening, has a tourist sleeping car from Boston to Chicago six days in the week, the cars running alternately over the Lake Shore and the Michigan Central. These tourist cars make the eastward trip on train No. 14.

Nicaragua Canal Concession Cancelled.

The concession of the Maritime Canal Company to build the Nicaragua Canal had been cancelled absolutely on account of the failure of the company to appoint arbitrators to settle the differences that arose through the action of Nicaragua in granting a new concession to the Eyre-Cragin syndicate to construct the canal. The final action of Nicaragua arose from the fact that the concession of the Maritime Canal Company expired on Oct. 5, 1899. An extension was applied for on the ground that the company had been prevented by certain circumstances, not the fault of the company, in carrying out its contract. When the extension was refused the company asked for the appointment of arbitrators to decide the dispute in accordance with a provision of its original concession. This request was granted, but the company declined to abide by the rule adopted by Nicaragua that only Nicaraguans must be appointed as arbitrators.

A Personal Claim in Switzerland.

In Switzerland, as a gateman was closing the barrier at a grade crossing, a horseman came galloping up, rushed against the gate, and caused the horse to fall so as to push the gateman upon the track, where the train cut his head off. His widow sued the railroad company for damages and in the first instance recovered; but on appeal the higher court found for the company. There was no doubt that the man met his death in the discharge of his duty; but the court was unable to find that it was due to the company's negligence. If only it had been the rider instead of the gateman who got his head cut off, justice would seem to have been done.

Wire Rod Production in the United States in 1899.

The American Iron & Steel Association has reports from the iron and steel wire rod makers in the United State that the production in 1899 amounted to 1,099,376 gross tons, against 1,071,683 tons in 1898 and 970,736 tons in 1897, showing an increase of only 27,693 tons, or a little over 2.5 per cent in 1899 over 1898. As compared with 1897 the increase in 1899 amounted to 128,640 tons, or over 13 per cent. The production of 1899 was the largest in our history. Pennsylvania made the largest quantity in 1899, with Ohio second, Illinois third, and Massachusetts fourth. Three other States, New Jersey, Kentucky and Indiana, also rolled rods in 1899. The total imports of rods in 1899 amounted to 17,964 gross tons and to 15,985 tons in 1898. Our exports of steel wire rods amounted to 16,992 tons in 1899 and to 18,510 tons in 1898.

The American Sheet Steel Co.

The American Sheet Steel Co. during the past week bought the plant of the W. DeWees Wood Co. at McKeesport, the plant of the Wellsville Plate & Sheet Iron Co. at Wellsville, O., and the site and machinery for the proposed Bessemer steel plant of the Woodson Steel Co. on the Monongahela River, near Pittsburgh. In addition to the above the American Sheet Steel Co. has absorbed the following: Apollo Iron & Steel Co., Vandergrift, Pa.; Cambridge Iron & Steel Co., Cambridge, O.; Canton Rolling Mill Co., Canton, O.; Chartiers Iron & Steel Co., Carnegie, Pa.; Corning Steel Co., Hammond, Ind.; Dennison Rolling Mill Co., Dennison, O.; Dresden Iron & Steel Sheet Co., Dresden, O.; Ewald Iron Co., Lyon County, Ky., and Louisville, Ky.; Falcon Iron & Nail Co., Niles, O.; Hyde Park Iron & Steel Co., Hyde Park, Pa.; Kirkpatrick & Co., Limited, Leechburg, Pa.; P. H. Laufman & Co., Limited, Apollo and Saltsburg, Pa.; Midland Steel Co., Muncie, Ind.; Aetna-Standard Works of the National Steel Co., Bridgeport, O.; New Philadelphia Iron & Steel Co., New Philadelphia, O.; Newport Rolling Mill Co., Newport, Ky.; Old Meadow Rolling Mill Co., Scottdale, Pa.; Piqua Rolling Mill Co., Piqua, O.; Pittsburgh Sheet Mfg. Co., Shousetown, Pa.; Scottdale Iron & Steel Co., Limited, Scottdale, Pa.; West Penn Sheet Steel Co., Leechburg, Pa.; Struthers Iron & Steel Co., Struthers, O.; Coshocton Rolling Mill Co., Coshocton, O.; Reeves Iron Co., Canal Dover, O.; Chester Rolling Mill Co., Chester, W. Va. The W. DeWees Wood Co. was established about 45 years ago and has a world-wide reputation for its Russian sheet iron. The general office of the Sheet Steel Co. is in the Battery Park Bldg., New York.

Panorama of the Siberian Railroad.

At the Paris Exposition, according to the correspondent of the Washington Star, there is a most elaborate exhibit, sent by the Russian Government, designed to afford all visitors to the Fair an opportunity to make an imaginary journey from Moscow to Pekin, which is said to be as "natural as life." A luxurious exhibition passenger train, which is situated partly in the Russian and partly in the Chinese section of the grounds, is placarded as a "special through train" and the visitor desiring to enter it can do so by buying a long coupon ticket; and when he gets in and takes his seat the train apparently starts. By the movement of three separate sets of scenery, arranged at the side of the cars, the natural movement of a train over plains and valleys, through hills and across bridges, is simulated as nearly as possible. The first line of scenery represents the ground, ditch and fence near the track, the next one the fields or other features in the mid-distance, and the third and last represents the mountains or horizon. The different lines move at different speeds, the outer line being, of course, the slowest. The illusion of a station at the starting point is said to be perfect. The scenery has been prepared with much labor and ingenuity. Several of the principal features of the line, such as Nijni Novgorod, Tobolsk, Lake Baikal and the Amoor River, are shown in paintings said to be really vivid. The artist, Mr. Jambon, made the trip to Pekin to get sketches for his paintings.

Speed on Interurban Electric Railroads.

We have secured from three electric railroads running a heavy interurban electric service information in regard to the train speeds on their lines. The Union Traction Company, of Indiana, now makes a maximum of about 35 miles an hour. With the new equipments which have been ordered, including Baldwin-Westinghouse trucks and 150 h. p. Westinghouse motors (two for each car), the maximum speed will be raised to 43 miles an hour. It was first intended to have these new motors geared for a maximum speed of 50 miles, but after consideration the conclusion was reached that a better schedule speed could be obtained by not gearing so high.

The Rapid Railway Co. (the Mt. Clemens fast line), with offices at Detroit, now controls a line 55 miles long, over which electric cars are run at a schedule speed of 30 miles an hour, including stops. This road is working an extension of 20 miles and it is expected that the high speeds already attained will be considerably exceeded.

The Buffalo & Lockport Railway runs between Lockport and Buffalo, where it parallels the steam roads, and consequently an effort has been made to make as high schedule speds as possible. Between Lockport and the Buffalo City line, a distance of 20 miles, the run is made in 40 minutes. The trip from Lockport into Buffalo, 26 miles, is made in one hour and 10 minutes, 30 minutes of which is taken up in going from the city line into the center of the city. The time by the New York Central trains from Buffalo to Lockport, a distance of 26 miles, is 55 minutes. If fast time could be made in the city limits, the schedule speed of the electric cars would be much higher than it is.

The Sale of the John Stephenson Car Works Postponed.

The receiver's sale of the John Stephenson Car Works at Bay Way, near Elizabeth, N. J., which was to take place April 25, has been postponed until May 23. Albert A. Wilcox, Receiver, 95 Liberty St., New York.

Harbor Improvements in Japan.

Japan is contemplating important harbor improvements at Tokio, Kobe, Osaka and other places. At Tokio, according to Dr. Furnichi, the Vice-Minister of Communications, the cost of the proposed harbor will be approximately as follows: Stone-faced embankment and quays, 14,000,000 yen; reclamation, 9,000,000 yen; machinery, 5,000,000 yen; materials and sundries, 13,000,000 yen; warehouses and buildings, 18,000,000 yen; total, 59,000,000 yen, or nearly £6,000,000 sterling. By postponing the work on part of the embankment and quays, this sum may be reduced by about £700,000, making a total of £5,300,000 or thereabouts. It is proposed to spread this expense over a period of about ten years, at the rate of 3,000,000 yen for the first year, and 5,000,000 yen per annum until the work is completed. At Kobe the Harbor Construction Investigation Committee has submitted a plan. The total cost is estimated at about 23,000,000 yen, or, say, £2,400,000, of which it is hoped that about £1,500,000 will be contributed by a Government subsidy. In this case, also, it is proposed to spread the work over a period of about ten years. The plan comprises the reclamation of about 360 acres of foreshore, the construction of upward of 9,000 ft. of wharves, with a depth of from 24 to 30 ft., and a breakwater enclosing an area of 560 acres, with a depth of 30 ft. or upward.

Fast Run on the Union Pacific.

On Wednesday, April 18, the Union Pacific ran a special train of four cars carrying officers of the road between Cheyenne, Wyo., and Omaha, Neb. On the latter part of this run some fast time was made. The distance, 138 miles, between North Platte and Grand Island, was run in 138 minutes, a stop of four minutes being made at Grand Island to change engines. From that point to Omaha, 153 miles, the time was 153 minutes, making the total time 295 minutes for the entire distance of 291 miles. Two stops were made for water and it was necessary to reduce speed at other points, so the average running speed was better than a mile a minute.

Medals on the B. & O.

About 1,500 enginemen of the Baltimore & Ohio are to receive from the company medallions on each of which there will be an inscription telling the length of the recipient's service. Two enginemen have worked for the company more than 50 years each, and these will have medallions of gold, which will serve as life passes over the lines of the company. The next 11, who have served over 45 years, will receive silver medallions, and the remainder will receive bronze. Over 1,200 of the 1,500 have been in the service of the road for 10 years or more.

Organization of the Pennsylvania Railroad.

We published last week a diagram showing the organization of the Pennsylvania Railroad. Although we took great pains to have this up to date it seems that two Assistant Engineers were omitted. One of these is the Assistant Engineer of Motive Power of the Northern Central Railway Division, the other the Assistant Engineer of Motive Power of the Philadelphia & Erie Division. Both of these pos-

tions are held by one man, his title being Assistant Engineer of Motive Power Philadelphia & Erie Railroad Division and Northern Central Railway. Naturally, he reports through the Superintendent of Motive Power to the General Superintendent.

An Oregon Ship Building Plant.

The Wolff & Zwicker Iron Works, Portland, Ore., will build a ship building plant and machine shops costing about $250,000, at St. James, Ore., about five miles below Portland, on the Willamette River.

American Locomotives in Germany.

On the 13th of February last there was forwarded to the State Department an editorial article from the Fränkische Curier, of Nuremberg, embodying a letter which had been sent by the Bavarian State Railroad administration to the two leading makers of locomotives in that Kingdom, wherein it was explained that the principal purpose of the Bavarian Government in ordering a number of American locomotives was to give Bavarian engineers and engine builders opportunity to test, study, and imitate, so far as should prove desirable, the superior features of the American machines. A second chapter of this episode appears in a paragraph which is herewith translated from the Bürger-Zeitung, of Berlin, issue of March 21, 1900, as follows: "The Prussian State railroad administration also intends to soon make a trial of American locomotives. These machines have shown that by reason of their great boiler space and heating surface, they are more efficient and economical. The Ministry of Public Works at Berlin has directed that specifications of locomotives of American models shall be laid before it in order that it may ascertain, through trials of freight and passenger engines, whether the introduction of that system here is advisable. The similar tests which the Bavarian State railroads have made with American freight engines have had the most satisfactory results; they have, as the minister reports, 'with faultless performance, cost considerably less than locomotives of similar class belonging to the Prussian railroad system.' It need hardly be explained that if these engines demonstrate their superiority and are adopted, they will not be built in any foreign country."

Locomotives on the Erie.

Changes in the last few years on the Erie Railroad in the locomotives used are of considerable interest as showing a tendency toward heavier weights and higher steam pressures. In December, 1895, there were 165 engines which carried steam at 160 lbs. pressure per sq. in. or over. There are to-day 425 engines which carry steam at or above that pressure. Of the 1,036 engines in service to-day on the road 84 are Vauclain compounds and one a Cooke two-cylinder compound. There are 206 consolidation engines with the Wootten type of boiler and 321 engines all told with Wootten boilers now on the road. On Dec. 1, 1895, there were 1,001 engines in service; to-day there are 1,036. At the earlier date there were 390 eight-wheelers and to-day 303. The consolidations in 1895 were 322 and this number has since been increased to 382. Then there were 148 10-wheelers and to-day 193. The number of moguls has decreased from 44 to 40 and the switching engines with three pairs of drivers has increased from 73 to 79 in the same period. The six 147,000 lb. six-wheel switching engines (with all of the weight on the driving wheels) now being used in the Jersey City yard are giving excellent satisfaction. These six engines were built at the Susquehanna shops of the road last fall.

South American Notes.

Plans have been drawn by Sr. Emilio Mitre, C. E., for the proposed canal to join the Madeco port, at Buenos Ayres, with Parana River at the height of the Tigre. The canal would be 17.3 miles long, 24.6 ft. deep, 118 ft. wide at bottom, and 192 ft. wide at top. The total excavation would be 10,900,000 cu. yds.

The Buenos Ayres Electric Tramways Co. has recently opened a portion of its new line to traffic, 2½ miles in length, with the result that for three months the gross income has been at the rate of $74,500 per annum, and the working expenses have been 45 per cent. of the receipts. The line when completed will extend from the center of the city to Belgrano, Flores and New Chicago, passing through a large part of the city hitherto unsupplied with rapid transit facilities.

LOCOMOTIVE BUILDING.

Studebaker Bros. Mfg. Co., South Bend, Ind., will buy one switching engine.

The Indiana, Illinois & Iowa is considering ordering at once 10 switching engines.

Newspaper reports state that Mr. Waters, of the firm of Spencer & Waters, Santiago, Chili, has left there for the United States to buy locomotives for some new roads in Chili.

The Southern has ordered eight passenger engines, with 21 in. x 28 in. cylinders, from the Richmond Locomotive & Machine Works and 30 consolidation engines, with cylinders of the same size, from the Pittsburgh Locomotive & Car Works.

CAR BUILDING.

The Plant System is asking bids on 200 box and 100 flat cars.

The Choctaw, Oklahoma & Gulf is again in the market for 200 box cars.

The Atchison, Topeka & Santa Fe will build at its own shops 300 box cars.

The Seaboard Air Line is reported as considering an order for 200 freight cars.

The Coahuila & Pacific is in the market for six passenger and 100 freight cars.

The Dairy Shippers' Despatch has ordered 150 refrigerator cars from F. M. Pease, Chicago.

The Mather Stock Car Co. has ordered 100 stock cars from the Illinois Car & Equipment Co.

The Marshalltown & Dakota is having 15 freight cars built at the St. Louis works of the American Car & Foundry Co.

The Denver & Rio Grande has ordered eight passenger and six mail and express cars from the Jackson & Sharp Co.

The St. Louis & San Francisco has ordered 300 freight cars, of 80,000 lbs. capacity, from the American Car & Foundry Co.

The Buffalo, Rochester & Pittsburgh has ordered 400 coal cars of 80,000 lbs. capacity, from the American Car & Foundry Co.

The Bangor & Aroostook has ordered 50 stock, 750 box and 800 flat cars from the American Car & Foundry Co., They will all be of 60,000 lbs. capacity.

The Illinois Central has ordered 1,500 coal cars of 80,000 lbs. capacity, 1,000 from the American Car & Foundry Co. and 500 from the Haskell & Barker Car Co.

The Republic Iron & Steel Co's order with the American Car & Foundry Co., referred to April 13, calls for gondola cars of the Canda type, to be of 80,000 lbs. capacity.

The Seattle & San Francisco Railway & Navigation Co. has ordered 15 Canda hopper bottom gondola cars of 100,000 lbs. capacity from the American Car & Foundry Co. They will be built at Huntington.

The Northern Pacific order with the American Car & Foundry Co. for 400 flat cars, noted last week, calls for cars of 70,000 lbs. capacity, to measure 41 ft. long. The design and details are practically the same as those recently built for the road by the Barney & Smith Car Co.

The Southern has ordered the cars referred to last week as follows: The Pullman Co., 10 coaches and 10 express cars; American Car & Foundry Co., 800 ventilated box cars; Southern Car & Foundry Co., 500 flat cars, and Barney & Smith Car Co., 1,200 double hopper and 200 coke cars. The freight cars will all be of 60,000 lbs. capacity and have Sterlingworth brake beams, Universal bearings and Simplex bolsters. The box cars will have Security doors and Chicago roofs.

The Pere Marquette has ordered 200 gondola cars from the American Car & Foundry Co., for delivery within 60 days. These cars are to be 36 ft. long, of 60,000 lbs. capacity, and half will be drop bottom and the others flat bottom cars. The special equipment includes bolsters made by the Pressed Steel Car Co., Monarch brake beams, Westinghouse air brakes, Fulton brasses, Detroit couplers, Butler draft rigging, McCord journal boxes and Detroit springs. Half the cars will have Fox pressed steel pedestal trucks, and the others diamond frame trucks with Fox pressed steel bolsters.

BRIDGE BUILDING.

ALLEGHENY, PA.—We are informed that the Pennsylvania Company intends to build subways or overhead bridges at the stations between Allegheny and Rochester, Pa., where four tracks are in use. As to whether a subway or overhead bridge will be built at any particular station depends upon the topography. There are about 20 stations. Probably one-half will be subways and one-half overhead bridges.

AMERICAN, O.—Bids are wanted May 8, according to report, for a 152-ft. steel bridge over the Little Scioto River. Lafayette Jones, County Surveyor, Portsmouth, O.

AMSTERDAM, N. Y.—A hearing was given April 24 by the Railroad Commission on a plan to change the Mineville crossing on the West Shore RR. from grade to undergrade. F. J. Sullivan, City Attorney.

BALTIMORE, MD.—Among the appropriations made by Baltimore County for 1900, are $133,080 for the special fund for roads and bridges; also $33,020 for the same fund; $1,000 is appropriated for repairs to and improvement of bridges.

BAY CITY, MICH.—A new proposition for a steel viaduct over the Michigan Central tracks at Washington St., West Bay City, has been presented to the City Council. The estimated. cost is $30,000. (Aug. 4, 1899, p. 558.)

BILOXI, MISS.—An election will be held May 5 to decide an issue of bonds to pay for a combination bridge to cross Back Bay at Biloxi, which is estimated to cost $17,000. We are informed that bids will soon be wanted. The House of Representatives has passed a bill for this bridge.

BOISE, IDAHO.—Board of Commissioners of Ada County, Idaho, will receive bids for a steel bridge across the Boise River, until May 26. Estimated cost, $15,000. Wm. Hountz, Chairman; C. S. McConnell, Clerk. (Mar. 16, p. 175.)

BOSTON, MASS.—An agreement has been reached between the New York, New Haven & Hartford and the city regarding a bridge under the railroad on Columbia Road.

BRIDGEPORT, CONN.—The Berlin Iron Bridge Co. has the contract for 13 bridges on the New York, New Haven & Hartford. Ten are heavy plate girder four-track railroad bridges, six of which are located in Bridgeport. Three other bridges are to carry highways over the tracks. There is also a long heavy four-track riveted lattice bridge on the Plymouth Division near Boston.

BUENOS AYRES, ARGENTINE.—The Buenos Ayres & Rosario Ry. Co., Ltd., has submitted plans to the Government for a drawbridge across the Tigre River.

BUFFALO, N. Y.—The Council has been petitioned to include in this year's estimates provision for at least one new liftbridge over the Buffalo River. Two new bridges are needed, one to replace the Ohio St. structure across the Buffalo River and the other across the Blackwell Canal at Michigan St. Each is estimated to cost $80,000.

Reports state that the Governor has signed the bill to permit the Mather Power Bridge Co. to build an experimental power bridge over the Niagara River.

The bridge over Cazenovia Creek at South Park Ave. has been declared unsafe. F. V. E. Bardol, Chief Engineer of the Board of Public Works, informs us that it has not been decided as yet to rebuild.

BURLINGTON, IA.—Citizens of this place, according to report, propose a new wagon and railroad bridge 2,300 ft. long over the Mississippi River. Estimated cost, $800,000.

BURLINGTON, VT.—The Central Vermont has let a contract to the Edge Moore Bridge Works for a truss bridge of two spans, each 148 ft., to cross the Winooski River between Winooski and Burlington.

CONNELLSVILLE, PA.—The Baltimore & Ohio will strengthen the bridges and rebuild culverts east and west of Connellsville.

DELANCO, N. J.—Freeholder F. T. Jones is receiving bids for a new steel bridge across Rancocas Creek between Riverside and Delanco. It will be 400 ft. long, with 18 ft. roadway and two six-ft. sidewalks. An electric railroad will pay part of the cost.

DELPHI, IND.—The Lafayette Bridge Co. of Lafayette, Ind., has a contract from the Indianapolis & Louisville for a steel bridge of two spans 157 ft. each over the Wabash River.

ERIE, PA.—We are informed that an iron bridge of two spans about 85 ft. each will probably be built over the Philadelphia & Erie tracks at Eighteenth St. and Buffalo Road.

EUREKA, CAL.—The Surveyor of Humboldt County has been instructed to prepare two sets of plans for a bridge across the Van Duzen River near Alton, one for a Baltimore truss, and the other a combination bridge, the plans to be submitted to the Board of Supervisors May 14.

GALENA, ILL.—The County Board of Supervisors will probably authorize at its next meeting some highway bridges. J. C. Scott, Engineer.

GOLDENDALE, WASH.—Bids are wanted by the Klickitat County Court July 2 for bridges across Klickitat and Swale creeks.

GRAND RAPIDS, MICH.—Bids will soon be wanted for removing the bridge now at Bridge St., and rebuilding it at Wealthy Ave.; also for an entirely new bridge at the latter place. Geo. M. Ames, City Engineer.

JANESVILLE, WIS.—The Janesville & Southeastern Ry. Co. will build bridges over Western Ave. and Clarion St.

JERSEY CITY, N. J.—We are informed that the bids on the bridge over the Pennsylvania RR. cut at Baldwin Ave., Jersey City, which were submitted by the Clerk of the Board of Freeholders of Hudson County April 5 have been rejected, as the bridge under the present plans would encroach on the lands of the railroad company. New plans will be submitted to the Board May 3. John P. Egan, Clerk.

LEBANON, IND.—Bids are wanted May 9, according to report, for five county bridges. David A. Shackley, County Auditor.

LEWES, DEL.—The Philadelphia & Lewes Transportation Co. has let a contract to Wm. H. Vanden of Lewes, for a 1,200 ft. pier at $10,000.

LISBON, PORTUGAL.—The Minister of Public Works, Lisbon, will receive bids up to June 30 for bridges across the north and south branches of the River Mondego. Plans, specifications, etc., can be had from the Minister of Public Works.

MT. VERNON, GA.—The United States Senate has passed a bill authorizing the Atlantic & Gulf Shore Line RR. Co. to build bridges across the Ocmulgee and Oconee Rivers in Georgia.

NEW ORLEANS, LA.—The Louisville & Nashville bridge over the west branch of the Pascagoula River was destroyed April 22.

NEWPORT NEWS, VA.—Plans have been submitted to the Bridge Committee of the Council for a new viaduct over the railroad tracks at Twenty-eighth St. (Mar. 23, p. 191.)

NEW YORK, N. Y.—The City Council has authorized the Department of Bridges to make contracts for building the bridge over the East River and Blackwell's Island, from East Sixtieth St., Manhattan, to Long Island City. An appropriation for the preliminary work was authorized last year.

The plans, specifications, etc., for the approaches to the new East River bridge, on which bids are wanted not later than May 31 are mentioned in other parts of this issue of the Railroad Gazette.

NOME CITY, ALASKA.—The House of Representatives has passed a bill authorizing the Cape Nome Traffic Co. to build a bridge across the Snake River at Nome City.

NORFOLK, VA.—F. Richardson, President of the Southern Branch Drawbridge Co., informs us that the plan to build a drawbridge over the Elizabeth River has been indefinitely postponed on account of the opposition of the A. & C. Canal Co. (April 27, p. 278.)

NORTH ADAMS, MASS.—Plans and specifications have been prepared for a steel viaduct over the Fitchburg RR. and the river at Greylock.

NORTHAMPTON, MASS.—The Berlin Iron Bridge Co., East Berlin, Conn., has the contract to build the bridge across the Connecticut River, to Hadley, for the Northampton & Amherst St. Ry., at about $80,000. The bridge is to be finished in four months. It will be of steel, and 1,263 ft. long. The seven spans will include four of 153 ft., one of 306 ft., one of 180 ft. and one of 165 ft. The longest span will be on the Hadley side. The longest span will be 16 ft. wide, and the others 14 ft. There will be six piers, the largest 10 ft. in diameter at the base and five feet at the top.

OIL CITY, PA.—A bridge 900 ft. long, according to report, is contemplated over the Allegheny River at Oil City.

OTTAWA, ONT.—The Chaudière Falls suspension bridge between this place and Hull, Que., was destroyed by fire last week.

The Ottawa Improvement Commission has let a contract for the superstructure for the Rideau River bridge to the Dominion Bridge Co. for $22,880. The other bids considered were Hamilton Bridge Co., $24,800: King Bridge Co., Cleveland, O., $24,040. The bridge will be of four spans and will extend from the intersection of King and Redpath Sts., cross the Rideau to Union St., New Edinburgh. The contract for the substructure has been let to A. Begg, at $13,000.

The Canada Atlantic is negotiating with the city for building subways under the tracks at the Elgin St. yard. Estimated cost, $40,000.

OXFORD, N. C.—Local reports state that all the bridges across the Tar River in Granville County have been washed away except one at Cannady's Mill.

PIERRE, S. D.—The House of Representatives has passed a bill authorizing the Duluth, Pierre & Black Hills RR. Co. to build a bridge across the Mississippi River at Pierre.

PHILADELPHIA, PA.—The Special Committee of the City Council appointed to consider the abolition of grade crossings of the New York Division of the Philadelphia & Reading along Ninth St from Fairmount Ave. to Huntingdon St., has plans which estimate the cost of the steel work at $2,640,000; and on the Richmond Branch between Kensington and Frankford Aves., at $1,500,000.

PITTSBURGH, PA.—The Pittsburgh & Lake Erie has let a contract to Stratton, Lewis & Co. for the bridge over the Back Channel of the Ohio River to Neville Island. It will consist of four through spans, one 252 ft., one 233 ft., and two of 136 ft. Old bridge material on hand will be used.

ROCKFORD, ILL.—The city proposes to build a bridge over Kent Creek.

The matter of a bridge over Rock River is again under consideration. Edwin Main, City Engineer.

ROME, N. Y.—The City Engineer will make plans for a bridge at Calvert St.

ST. JOHN, N. B.—A bridge is proposed across the St. Croix River to connect the South Shore and the Washington County roads. A bill is before Parliament.

ST. THOMAS, ONT.—Two bridges will be built over Kettle Creek near Port Stanley, for which plans are being made by James A. Bell, County Engineer, this place.

SOUTH ORANGE, N. J.—The D., L. & W. will put five streets either under or over the tracks between South Orange and Milburn.

TEMPLE, TEX.—The Bell County Court has been petitioned to rebuild the washed-away bridges at Three Forks.

WEAVERVILLE, CAL.—Plans and specifications for a bridge across the Trinity River at Lowden's ranch, Trinity County, are wanted May 21 by R. L. Carter, Clerk of the Board of Supervisors. H. C. Ingram, County Surveyor.

WHYCOCOMAGH, NOVA SCOTIA:—C. B. Church of Halifax, Commissioner of Public Works for Nova Scotia, is receiving bids for a bridge across the channel leading from St. Patrick's Channel to Whycocomagh Bay, Victoria County. Plans and specifications may be seen at the Department of the Ministry of Public Works, Ottawa.

WOODBURN, ORE.—Sealed bids will be received at the office of the clerk of Marion County, Ore., up to May 10, for a bridge 320 ft. long, on the road leading east from and near the town of St. Paul, according to specifications on file with W. W. Hall, Clerk.

ZANEZVILLE, O.—James L. Starkey, Auditor of Muskigum County, will receive bids until May 15 for $200,000 4 per cent. bridge bonds.

Other Structures.

BISMARCK, N. D.—The Northern Pacific intends to build a passenger station at Bismarck, but no plans have been made.

BRANTFORD, ONT.—The Canadian branch of the Pratt & Letchworth Co., Buffalo, N. Y., has been put in operation. It occupies the old Grand Trunk shops.

CHESTER, PA.—The Seaboard Steel Casting Co. has let a contract to the McClintic-Marshall Construction Co. for the steel buildings on the river front between Jeffrey and Townsend Sts. The main foundry building will be 560 ft. long x 110 ft. wide. The machine shop will be 80 x 300 ft., with an extension for a power house. Work on laying the railroad sidings to the shops has already been begun.

DENTON, TEX.—The Texas & Pacific will soon build a new station at this place at a cost of about $30,000.

DES MOINES, IA.—Chicago & Northwestern will build a freight depot on East Fourth St. between Grand Ave. and Locust St., and will be of brick, 300 ft. long by 50 ft. wide.

DETROIT, MICH.—The contract for the improvements to the Fort St. union station for the Pere Marquette RR. has been let to Chas. Hoertz of Grand Rapids.

EMPORIA, VA.—The shops of the Narrow Gage Division of the Southern Railway at this place were destroyed by fire April 23.

LEBANON, PA.—W. J. Gruhler of Germantown has the contract for the new passenger station in Lebanon for the Philadelphia & Reading.

MCKEES ROCKS, PA.—Plans for the new Pittsburgh & Lake Erie shops at McKees Rocks are being made.

MEADVILLE, PA.—The Meadville Malleable Iron Co. is receiving bids on new buildings as follows: Main building, or foundry, 82 x 361 ft.; annealing house, 85 x 120 ft.; core house, 50 x 60 ft., and another building, which will contain the power room, boiler room, tumbling room, carpenter shop, pattern shop and shipping room, will be 40 x 200 ft.

MICHIGAN CITY, IND.—The Michigan Central will build a new freight house at this place. It will be 210 ft. long and 40 ft. wide.

MICHIPICOTEN, ONT.—Dan. McGillivray of Vancouver, a contractor for the Ontario & Rainy River RR., has a contract for building the ore dock for the Algoma Central Ry. at this place. It will cost about $200,000.

MONESSEN, PA.—Contracts will soon be let by the Pittsburgh & Lake Erie for new stations at Monessen, Beaver Falls and Braddock. The Braddock station will be 25 x 50 ft.; Monessen station 25 x 75 ft., and that at Beaver Falls, 25 x 60 ft.

MONTICELLO, N. Y.—The freight house of the Monticello & Port Jervis, one passenger car, three box cars and some adjoining buildings were destroyed by fire April 26.

NILES, MICH.—The Michigan Central will spend about $100,000 for round houses and machine shops at Niles.

OMAHA, NEB.—Plans are being made to remodel the general office building of the Chicago, Burlington & Quincy at Omaha, at the corner of Tenth and Fernam Sts.

OTTAWA, ONT.—The Baldwin Iron & Steel Co., of Ottawa, has been incorporated with a capital stock of $40,000 and will build a shop and will require some machinery and tools to make engines and other machinery.

POINT RICHMOND, CAL.—The Atchison, Topeka & Santa Fe will build machine shops and round houses at this place on San Francisco Bay, opposite San Francisco, where it has already finished a system of water works. Freight slips and wharves are now being built.

PORT PERRY, PA.—A new pasenger and transfer station will be built here by the Baltimore & Ohio.

PROVIDENCE, R. I.—The Union Railroad Co., operating a number of street railroads, will build machine and repair shops on Cranston St., adjoining the New England RR. The building will front 400 ft. on Cranston St., and will be 300 ft. deep. The approximate cost is $250,000.

QUINCY, ILL.—The F. W. Menke Stone & Lime Co., of this place, has the contract for the new Wabash passenger station in Quincy. The building will be 98 x 89 ft., three stories high, to be built of buff brick, with Bedford stone trimmings, and will have marble floors and wainscoting, and cost $33,000. This does not include any furniture, heating or plumbing for which contracts will be let soon. The new station and sheds will occupy two blocks. Work has already been begun at Sixth Ave. and Jersey St.

RICHMOND, VA.—The contract for the union depot of the Chesapeake & Ohio and the Seaboard Air Line at Richmond has been let to J. E. & A. L. Penrock of Philadelphia, Pa. The A. & P. Roberts Co. of Pencoyd, Pa., has the contract for the steel work. The depot will be built between two viaducts and will be, with the tower, 110 ft. high, 105 ft. long and 75 ft. deep. The train sheds will be 550 ft. long and 102 ft. wide. The approximate cost is $500,000. The plans were made by Wilson Bros. & Co., Philadelphia.

SHARON, PA.—The McClintic-Marshall Construction Co., Pittsburgh, has a contract for several tons of structural material for the new plant of the Sharon Tin Plate Co. at Sharon, Pa.

SIOUX CITY, IA.—The Union Station and terminal property, owned by the Trust Co. of North America, will be improved at a cost of about $400,000.

YORK, PA.—A contract for a new freight warehouse for the Northern Central at York has been let to Sechrist Bros. The building will be between Duke and Queen Sts., and be 272 ft. long, 33 ft. wide. Work is to be finished by July 1.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xi.)

Canadian Society of Civil Engineers.

At the meeting of the Society on April 26, a paper on "Sewage Disposal" was read by Mr. R. S. Lea.

Western Society of Engineers.

The April issue of the Journal of the Western Society of Engineers contains papers and discussions on protecting trains, on preserving timber and on the rebuilding of a swing bridge on the Chicago & Northwestern.

The Railway Signaling Club.

The next meeting of the Club will be held in Chicago, Ill., at the Great Northern Hotel on May 8, at 2.30 p. m., when two papers will be presented, one, "Interlocking Protection for Grade Crossings," by J. I. Vernon, Supervisor of Interlockings, N. Y., N. H. & H. R. RR., and the other, "Technical Institution in Railroad Signaling and Interlocking," by Prof. R. A. Smart of Purdue University.

American Society of Civil Engineers.

At the meeting of May 2 the paper presented for discussion was that by Mr. Moncrieff on "The Practical Column," etc., which was discussed at considerable length in the Railroad Gazette of April 20, p. 250.

At the meeting of May 16 informal discussions will be held on proposed standard specifications for structural steel and for wrought iron. These are the specifications proposed by Committee No. 1 of the International Association for Testing Materials.

Three topics have been brought forward for informal discussion at the annual convention the first week in July in London. These are "The Height of Buildings," "Recent Practice in Rails" and "Filtration of Water for Public Use."

Car Foremen's Association of Chicago.

The regular meeting of the Car Foremen's Association of Chicago was held in the Monadnock Building, Thursday evening, April 12, about 50 being present. Twenty-one applicants were elected to membership. The report of the Committee on Recommended Changes in the M. C. B. rules was presented at this meeting, but as the present rules are very satisfactory few changes were thought necessary. In regard to the question, whether owners should be held responsible for lamps, tools, etc., missing from the interior of passenger equipment when offered in interchange, it was considered that inspectors were not afforded an opportunity to inspect the interior of passenger equipment cars, and therefore the owners should be held responsible. It was also held that charge could be made for both labor and material in replacing a missing brake wheel where the brake staff and attachments were intact.

In the discussion of the loss of brake shoes it was the consensus of opinion that this loss is largely due to boys stealing keys. The statement was made, however, that if the Christie brake shoe key were made in accordance with M. C. B. standards, it could not be removed without tools, and it was suggested that the members look into the matter of how the keys are being made.

Engineers' Club of Philadelphia.

The papers for the meeting of the Club on Saturday, May 5, are "Modern Methods of Manufacturing Illuminating Gas; with a Description of its Distribution Under High Pressure," by Frederick H. Shelton; "High-Speed Toothed Gearing," by James Christie; "Interchangeable Gearing," by Wilfred Lewis; and "The Drawing of Gear-Tooth Curves," by L. F. Rondinella.

The Recent Failure of the Austin Dam.

At the meeting of the Club on April 21 Dr. H. M. Chance exhibited and described a series of views of the dam and power house on the Colorado River at Austin, Tex., that were taken shortly before and after the break in the dam, which occurred under flood conditions on April 7. This dam was about 1,000 ft. long, with a mean thickness of 30 ft. to the top of the toe, and when the break occurred a section near the middle, about 500 ft. long, was slid bodily down the stream and afterwards broken up. The part of the power house which was located just below one end of the dam collapsed about 13 hours after the dam broke, probably because of the scouring effect of the large body of water let loose. In discussion, Mr. Emile Geyelin explained that in consultation he had recommended that the power house should be placed at least 100 ft. below the dam. Dr. Chance gave a brief account of the discrepancies in the accounts of the break which he had obtained from eye-witnesses. Mr. Charles Hewitt called attention to the fact that the dam leaked before its failure, but Mr. S. S. Harper contended that the large amount of silt which had collected back of it showed that these leaks were inconsiderable.

At the conversational meeting to be held on May 12, Mr. James Christie will present "An Historical Sketch, and Brief Description of the Principal Routes Proposed for a Canal Across the American Isthmus."

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. James Cullen, Superintendent of Motive Power and Machinery of the Nashville, Chattanooga & St. Louis, died at Nashville, Tenn., April 19, aged 64 years. Mr. Cullen was a native of Ireland.

—Mr. John B. Watson, formerly with the American Live Stock & Transportation Company, has been appointed Master Car Builder of the Nelson Morris & Company Refrigerator Line, Chicago, Ill., succeeding Wm. Miller, resigned to go with the Erie & Wyoming Valley RR.

—Mr. John T. Cochrane is General Manager of the Carrollton Short Line, a new railroad in Alabama. Mr. Cochrane has been connected with the Tuskaloosa Belt Ry. since 1893. His resignation as Superintendent of that road took effect April 20. The Carrollton Short Line runs from Reform, Ala., on the Columbus & Montgomery Division of the Mobile & Ohio, southeast about nine miles to Carrollton. Mr. Cochrane's headquarters for the present will be at Tuskaloosa.

—Mr. W. S. Smith is the new Vice-President and Traffic Manager of the Sibley Lake, Bristeneau & Southern and other railroads owned by the Long-Bell Lumber Co., with headquarters at Kansas City, Mo. Mr. Smith was born in Kentucky Dec. 4, 1865. His first railroad experience was as local attorney for the Northern Pacific and Great Northern in 1892. He became General Counsel for the Northwestern Steamship Co. in 1894, and Secretary and Traffic Manager of the same company the following year. In 1896 he entered the service of the Wabash as Pacific Coast Agent and was promoted to the position of General Traveling Freight Agent in 1897. Two years later he was made General Traffic Manager of the Louisiana & Arkansas, with headquarters at St. Louis, which position he has just resigned.

—Mr. Henry F. Baldwin has been appointed Chief Engineer of the Chicago & Alton. Mr. Baldwin was born at Waterbury, Md., April 17, 1862. He was graduated from the Massachusetts Institute of Technology and entered railroad service in 1884 as a rodman on the Louisville & Nashville. He remained with that company until August, 1889, serving successively as rail inspector, supervisor and roadmaster. Then for several months he was Division Roadmaster of the New York, Lake Erie & Western. In March, 1890, he was made Chief Engineer of the Chicago & Eastern Illinois, and continued in that position until May, 1894, when he was made Chief Engineer of the Chicago, Peoria & St. Louis. From Oct. 1, 1895, until he went to the Alton in April last, he was Engineer of Maintenance of Way of the New York, Lake Erie & Western.

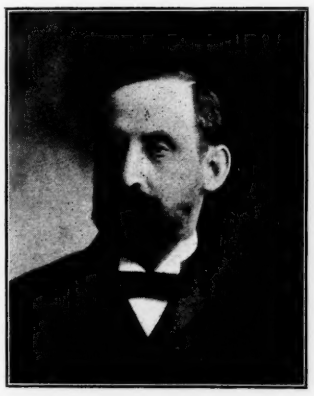
—Mr. Chas. H. Ketcham, the new Division Superintendent of the Delaware, Lackawanna & Western at Hoboken, N. J., was born at Rock Island, Ill. He began railroad service as a messenger on the Chicago & Alton at Delavan, Ill., and from 1872 to 1884 filled the positions of telgraph operator, train dispatcher, yardmaster, trainmaster, etc., in the service of the Wabash, the Chicago & Northwestern, the Louisville & Nashville and the Chicago & Eastern Illinois. From Aug. 20, 1884,to Jan. 1, 1890, he was Freight Agent of the West Shore at Buffalo, N. Y. Then until July 20, that year, Assistant Superintendent of the Buffalo Division of the same road. From Feb. 1, 1893, to April 1, 1899, he was Superintendent of the same division. He then took service with the Delaware, Lackawanna & Western, as Terminal Agent at New York, from which position he was transferred April 30.

—Mr. Payson Tucker died at St. Clair, Mich., April 27. He was born at Lowell, Mass., in 1840, and entered railroad service in 1853 as clerk in the office of the Treasurer of the Portland, Saco & Portsmouth and held this position until 1860, when he was made General Ticket Agent and Paymaster. In 1875 Mr. Tucker became Superintendent of the Maine Central and served as Superintendent until 1882, when he was made Vice-President and General Manager. Mr. Tucker resigned from the company in 1897.

Mr. Tucker was quite a famous man in his way. He was intelligent and energetic, and in spite of his want of early education was a man of liberal mind. He was enterprising in promoting improvements in equipment and in management, and but for certain unfortunate personal habits he would probably have been active and useful for many years and taken high rank among the railroad men of the country.

—Mr. Chas. E. Dearborn has been made Chief Engineer of the Pittsburgh & Ohio Valley line which is being built by the American Steel & Wire Co., on Neville Island, Pittsburgh, Pa. Mr. Dearborn was born at Brattleboro, Vt., June 8, 1867. His first railroad work was with the Union Pacific in 1886 in the Maintenance of Way Department. He was rodman until 1887; Assistant Engineer of Idaho Division until 1888, and Assistant Engineer of the Nebraska Division until 1889. The following year he became Resident Engineer of the New Orleans, Natchez & Fort Scott. For the year following 1890 he was Assistant Engineer of the Akron & Chicago Junction, and the next year held a similar posiion on the Chicago & Eastern Illinois. For a year following June, 1892, he was Assistant Chief Engineer of the Yankton, Norfolk & Southwestern. He entered the service of the Calumet & Blue Island, afterwards the Chicago, Lake Shore & Eastern, June 28, 1894, remaining with that company as Chief Engineer until April 24, 1899, when he accepted a similar position with the Davenport, Clinton & Eastern and the Davenport, Rock Island & Northwestern, now operated by the latter company in the interest of the American Steel & Wire Co. Upon the completion of the building of that road he was transferred to his new position.

—As previously noted in these columns, Mr. Solomon F. Deyo has been appointed Chief Engineer of the New York Rapid Transit Subway Co., which has the general contract for building the underground railroad in New York City. Mr. Deyo was born at Gardiner, Ulster County, N. Y., Dec. 17, 1850. He was graduated from Union College in 1870 with the degree of Civil Engineer. His first railroad work was in 1871 on the Harlem River Branch of the New York, New Haven & Hartford as rodman and later as Resident Engineer in charge of construction from Harlem River to Pelham Bay. From 1873 to 1876 he was Assistant Engineer on the Fourth Avenue improvement in charge of work between Fifty-sixth and Seventy-ninth Sts., New York. For the five years following 1876 he was Superintendent of the American Metaline Co., New York. He then entered the service of the South Pennsylvania RR. as Division Engineer on surveys, and was made Resident Engineer on construction of the same road in 1883. In 1886 he was Principal Assistant Engineer on surveys of the Buffalo & Geneva RR., and Assistant Engineer on the Lehigh Valley in charge of surveys for branch lines in the vicinity of Wilkesbarre, Pa. In 1887 he made a railroad reconnaissance in northern Alabama for the Pioneer Mining & Manufacturing Co. A year later he returned to the New York, New Haven & Hartford as Assistant Engineer in charge of improvement work between Mamaroneck and Port Chester, N. Y. He remained with the company as Division Engineer until 1898 and then as District Engineer in charge of the Western District until his recent change.



ELECTIONS AND APPOINTMENTS.

Ashland Coal & Iron.—E. C. Means, Superintendent at Ashland, Ky., has resigned.

Bismarck, Washburn & Great Falls.—Edwin C. Washburn has been appointed General Manager, with headquarters at Minneapolis, Minn. Mr. Washburn will have charge of the Purchasing Department.

Buffalo, Rochester & Pittsburgh.—The headquarters of Superintendent G. F. Gardner have been removed from Bradford, Pa., to DuBois, Pa.

Carrollton Short Line.—John T. Cochrane, heretofore Superintendent of the Tuskaloosa Belt, has been appointed General Manager of the C. S. L.

Central Pacific (Southern Pacific).—The officers of this company are: President, Isaac L. Requa; secretary, J. L. Willcutt, and treasurer, H. T. Smith.

Chicago & Northwestern.—F. R. Pechin has been transferred as Assistant Superintendent from Milwaukee, Wis., to Chicago, Ill. W. B. Causey succeeds Mr. Pechin as Assistant Superintendent at Milwaukee, Wis.

Columbia Southern.—George J. Mohler has been appointed General Manager, with headquarters at Shaniko, Ore., instead of Superintendent of Construction as incorrectly stated last week. (P. 279.)

Fort Worth & Rio Grande.—Oscar Menefee, heretofore Acting Superintendent of Transportation at Fort Worth, Tex., has been appointed Superintendent of Transportation.

Galveston, Houston & Northern.—W. W. Kent, Manager, having resigned, that position has been abolished. W. B. Mulvey has been appointed Superintendent.

Grand Trunk.—Owing to the resignation of G. B. Reeve, General Traffic Manager (p. 161), J. W. Loud, General Freight Agent, has been appointed Freight Traffic Manager, W. E. Davis, General Passenger Agent, has been appointed Passenger Traffic Manager. The position of General Traffic Manager has been abolished.

Los Angeles Terminal.—F. K. Rule has been appointed Acting General Manager, succeeding S. B. Hynes, resigned.

Louisville, Evansville & St. Louis.—M. A. Zook, heretofore Engineer Maintenance of Way, has been appointed Chief Engineer, succeeding E. Holbrook, resigned.

Mexican National.—H. M. Taylor has been appointed Superintendent, with headquarters at San Luis Potosi, Mex.

New Orleans & Northwestern.—A. E. Wyatt has been appointed Superintendent of Roadway and Bridges and Buildings, with headquarters at Vidalia, La.

Omaha Bridge & Terminal.—J. H. Daniels, Secretary, has been appointed Traffic Manager.

Pennsylvania.—H. A. Fergusson has been appointed Assistant Engineer of Motive Power of the Philadelphia & Erie RR. Division and the Northern Central, succeeding D. M. Perine, transferred.

Pennsylvania Company.—David C. Copperstone, heretofore Assistant Auditor of Disbursements, has been appointed Auditor of Disbursements of this company and of the Pittsburgh, Cincinnati, Chicago & St. Louis, with headquarters at Pitsburgh, Pa. He is succeeded by J. J. Lyons who was auditor of the Cleveland, Akron & Columbus, and Mr. Lyons in turn is succeeded by Frank H. Reeves, with headquarters at Cleveland, O., effective May 1.

Pere Marquette.—George DeHaven having resigned as General Passenger Agent of the Grand Rapids District, H. F. Moeller has been appointed Acting General Passenger Agent, with headquarters at Grand Rapids, Mich., effective April 19.

Pittsburgh & Ohio Valley.—C. E. Dearborn has been appointed Chief Engineer with headquarters at Pittsburgh, Pa.

Richmond, Petersburg & Carolina (Seaboard Air Line).—John Skelton Williams (President of the S. A. L.) has been elected President of the R., P. & C., succeeding E. R. Williams, resigned.

Rio Grande Western.—Thomas Tipton has been appointed Purchasing Agent, with headquarters at Salt Lake City, Utah, effective May 1.

St. Louis Southwestern.—Fred H. Jones has been appointed General Passenger Agent of the St. Louis Southwestern Ry. of Texas, with headquarters at Tyler, Tex., effective May 1, succeeding S. G. Warner, resigned.

Seaboard Air Line.—At a meeting of the stockholders held April 28, S. Davies Winfield (President of the Continental Trust Company, Baltimore), Robert C. Davidson (President of the Baltimore Trust and Guarantee Company), John Skelton Williams, Jas. H. Dooley, Richmond, Va.; Wm. A. Marburg, Baltimore; Wm. F. Cochran, New York; J. Wm. Middendorf, Baltimore, and C. Sidney Shepard, New Haven, N. Y., were elected Directors. These gentlemen also compose the managing committee of the Greater Seaboard Air Line Organization under the agreement of January 5, 1900, and also the voting trustees of the stock for a period of 10 years. J. M. Sherwood was elected Secretary.

Southeastern of Yucatan.—The officers of this company referred to in the Construction column are: President, Olegario Molina; Vice-President, Rodulfo G. Canton; General Managing Director, Manuel Sierra Mendez; Attorney, Emilio Garcia Fajardo; Chief Engineer, Capt. Porfirio Diaz, Mexico City; Assistant Chief Engineer, Miguel Macedo y Arbeu, Merida, Yucatan. The City of Mexico representative is Joaquin D. Casasus. Among the bankers interested are: The Banco Yucateco, Merida, Yucatan; H. Scherer & Co., Mexico City, and Muller, Schall & Co., New York.

Western New York & Pennsylvania.—N. Thouron, Chairman of the Executive Committee, has resigned.

Wheeling & Lake Erie.—J. E. Taussig has been appointed Assistant to the General Manager; J. N. Merwin, Assistant General Freight and Passenger Agent. H. W. McMaster succeeds Mr. Merwin as Superintendent of the Toledo Division, with headquarters at Massillon, O., effective May 1.

RAILROAD CONSTRUCTION.

BALTIMORE & OHIO.—Grading is just begun on the branch from the Grafton & Belington Division at the mouth of the Buckhannon River, to run across Tygart's Valley River and up the south side of the Buckhannon River to the mouth of Big Run; thence up the valley of Big Run to the coal fields of the Century Coal Co., in all nine miles. (April 13, p. 245.) The road will probably be in operation in August. (Official.)

BIRMINGHAM, SELMA & NEW ORLEANS.—Mr. F. M. Abbott of Abbott, Miss., the new owner of this road, writes that if the city of Selma and Marengo County secure subscriptions to the capital stock of the company to the amount of $175,000 within the next 30 days, the railroad will be extended about 55 miles through the county of Marengo to some point on the Tombigbee River during the present year. (April 20, p. 263.)

BUFFALO & SUSQUEHANNA.—Grading is reported in progress for an extension from Bailey Run, Potter County, to run west to the head of Dents Run, Elk County, Pa., running down the fork to Sinnemahoning.

CANADA ATLANTIC.—The Ontario Government has granted the Central Counties Ry. a cash subsidy of $1,200 per mile for an extension of the Rockland Branch northeast about seven miles to Clarence Creek.

Another subsidy of $3,000 per mile has been granted to the Parry Sound Junction Line from Depot Harbor north to the town of Parry Sound, not to exceed five miles.

CAROLINA & NORTHWESTERN.—The stockholders have decided to make the extension of its line into Tennessee. (See Railroad News column.)

CENTRAL ONTARIO.—The Ontario Government has granted a cash subsidy of $3,000 per mile for 40 miles of extension from Bancroft, Ont., northwest to a point on the Canada Atlantic between Madawaska and Whitney. The company has about completed its extension from Coe Hill north 21 miles to Bancroft. (May 26, 1899, p. 279.)

CHICAGO, MILWAUKEE & ST. PAUL.—Winston Bros. of Minneapolis have taken the contract for the extension from Nippersunk, Ill., to Janesville, Wis. The line is under the incorporation of the Cook Lake & McHenry County in Illinois, and the Janesville & Southeastern in Wisconsin. (J. & S. E., April 20, p. 263.)

The company has made a proposition to the city of Sheboygan, Wis., for its proposed extension from the main line at Random Lake, to run northeast 15 miles to Sheboygan. (Jan. 26, p. 63.)

CHICAGO UNION TRANSFER.—Contracts are reported let and work begun on switch yards near the town of Lyons, Ill.

COAHUILA & PACIFIC.—There are about 200 men at work on this proposed line from Saltillo, Mex., west via Zepeda, Parras and Viesca to Torreron, on the Mexican Central and the Mexican International, all in the State of Coahuila. Preliminary surveys are finished and approved by the Mexican Government. Locating surveys are under way. Material for building is arriving daily and the company has on the ground over 20 miles of rails, some ties, etc. It expects to begin track laying about the middle of June. Some contracts are now being let and others will be let in the near future. L. K. Freese has a contract for ties. The maximum grade is 2 per cent., and the maximum curve 8°. J. J. Detwiler of Jersey City, N. J., is President. (April 6, p. 227.) A. W. Lilliendahl, E. M., of Saltillo, Mex., is general contractor. (Official.)

CUBA COMPANY.—This company has been incorporated, with a capital stock of $8,000,000, to develop the Island of Cuba by the building of railroads and otherwise. The immediate purpose is to build a railroad from Santiago west to Havana. Among the subscribers to the capital are Sir Wm. C. Van Horne, Chairman of the Board of Control of the Canadian Pacific; former Governor Levi P. Morton, of Morton, Bliss & Co.; John W. Mackay, President of the Commercial Cable and Telegraph Co., and of the United States and Hayti Telegraph and Cable Company; James J. Hill, a director of the Baltimore & Ohio and the Great Northern Ry. All the capital stock has been subscribed for and arrangements have been made for an immediate working capital of $2,500,000. At a meeting held in New York April 26, Sir Wm. C. Van Horne was elected President; Wm. Redmond Cross, Treasurer, and T. Sanford Beatty, Secretary. Another meeting is to be held on May 9 to discuss plans for work.

DELAWARE, LACKAWANNA & WESTERN.—An officer confirms the statement that the company is straightening its line from South Orange, N. J., to Milburn, and also building a third track between the same points. (April 20, p. 263.)

DES MOINES & NORTHERN IOWA.—This company has been incorporated in Iowa, to build a railroad from Des Moines north 200 miles via Boone, Webster City and Clarion to the Minnesota State line.

ELWOOD, ANDERSON & LAPEL.—Arrangements are being completed, according to report, for building this line from Elwood, Ind., south about 20 miles to Lapel, on the Chicago & Southeastern. Surveys are completed and the road is to be built in the interest of the American Tin Plate Co. Two miles of track is reported laid from Elwood south. (Oct. 13, 1899, p. 719.)

GREAT NORTHERN.—A. Guthrie & Co. of St. Paul are reported to have a contract for a proposed line to parallel the Duluth, Missabe & Northern from Stony Brook, Minn., north about 50 miles through Columbia Junction to Nelson, on the extension to Hibbing. (Feb. 16, p. 112.)

GULF & MANITOBA.—The Minnesota State Railway Commission has authorized this company to increase its capital stock from $50,000 to $7,000,000. The charter calls for a line from Duluth south 700 miles to Kansas City. E. E. Carpenter of Canton, S. D., is an incorporator. Frank T. Campbell of Beaver Falls, Minn., is President. (March 23, p. 193.)

HOUSTON, BRAZOS & NORTHERN.—Surveys are reported completed for 75 miles and contracts are to be let as soon as right of way is secured. The line is projected from Houston, Tex., north along the Brazos Valley to Fort Worth, about 250 miles, and thence into Indian Territory, in all about 400 miles. Colonel R. M. Hall of Houston, Tex., is President, and J. W. Maxcey, Chief Engineer. (Jan. 26, p. 64.)

IDAHO ROADS.—The White Knob Copper Co. is reported making a survey for a line from Blackfoot, on the Oregon Short Line, to run northwest about 100 miles to Houston.

ILLINOIS CENTRAL.—Surveys are reported in progress for a new line between Kuttawa, Ky., and Dulaney, about eight miles, which will shorten the distance and avoid heavy grades east of Eddyville.

An officer writes that the company does not intend to build any line, as reported, from Glen Allen, Miss., to Ben Lomond. (April 20, p. 263.)

LOUISVILLE & NASHVILLE.—A contract is let, according to report, for grading an extension from a point on the Southern Alabama Division to Camden, Ala., about 16 miles. It is said that the road is to be completed by Sept. 30.

MARINETTE, TOMAHAWK & WESTERN.—Press reports from Wisconsin state that this line is to be extended 15 miles into new territory.

MISSOURI PACIFIC.—The company has discontinued the use of the Webster St. station at Omaha, Neb., and is using the union station. Trains are running over the Union Pacific tracks between Omaha and South Omaha, thereby shortening the distance several miles.

NASHVILLE & SPARKS.—This company proposes to extend its line three miles this year. It has built nine miles of road and is to build from Sparks, Ga., on the Georgia Southern & Florida, east to Nashville. W. J. Rogers of Sparks, Ga., is President.

NEW YORK CENTRAL & HUDSON RIVER.—With reference to the contract reported two weeks ago (p. 263), an officer writes that work is in progress on a line connecting with the P. & N. W. at McGee's Junction, 0.34 mile, and with the same road at Canoe Creek, Pa., into the Canoe Creek coal lands, 3.2 miles. Messrs. McAtee & Ake of Clearfield, Pa., have the contract.

OMAHA CITY TERMINAL.—Surveys are completed and building is to be begun at once on this belt line in Oklahoma City, Okla. Contracts for grading, track laying, bridges, etc., are to be let within 30 days. (April 20, p. 263.) C. G. Jones is President, and George H. Gonzell, Engineer, both of Oklahoma City. (Official.)

OREGON RAILROAD & NAVIGATION.—The track between Huntington, Ore., and Haines, about 75 miles, is reported being laid with new 75-lb. and 80-lb. rail.

PENNSYLVANIA.—Reports state that an extension is to be built from Mt. Etna, terminus of the Mt. Etna branch, to run east eight miles to Petersburg, Pa., on the main line.

PINE BLUFF & WESTERN.—Surveys have been made, according to report, for an extension from Doylestown, Ark., to Beauxite, on the Little Rock & Hot Springs Western.

QUEBEC & SOUTHERN.—See Railroad News column. (Jan. 19, p. 48.)

RIO GRANDE, SIERRA MADRE & PACIFIC.—Plans are being matured, according to report, for the extension from Casas Grandes, Mex., west to the Pacific coast, in the vicinity of Topolobampo. J. Fewson Smith of Salt Lake City, Utah, is Chief Engineer. (Dec. 8, 1899, p. 853.)

SACRAMENTO & SAN JOAQUIN VALLEY.—The survey has been completed for this line from Stockton, Cal., north to Sacramento, making the distance approximately 50 miles. It runs via Freeport and along the Sacramento Valley. John Cross of Los Angeles, Cal., is President and Chief Engineer. (April 20, p. 264.)

SAN ANTONIO & BROWNSVILLE.—Right of way is secured into San Antonio, Tex., and it is stated that building is to be begun at once. The line is to run from San Antonio south 275 miles to Brownsville. H. M. Aubrey of San Antonio is President. (April 13, p. 246.)

SEATTLE & NORTHERN.—Grading is reported in progress on the extension from Hamilton, Wash., east about 20 miles to Sauk. (Dec. 29, 1899, p. 902.)

SEAWRIGHT, LITHIA SPRINGS & AUGUSTA.—The last Virginia Legislature passed a bill incorporating this company, with a capital stock of $50,000, with the privilege to increase to $100,000. The company purposes to build from Staunton north about 18 miles via Seawright Spring to Bridgewater in Rockingham County, the terminus of the Chesapeake & Western. Grades will not be heavy. Only one bridge will be needed. The company is completing a sanitarium and hotel at the Spring which is 11 miles from Staunton. E. L. Edmondson, President of the Seawright Magnesian Lithia Spring Co., Staunton, Va., is an incorporator. (Official.)

SOUTHEASTERN OF YUCATAN.—Captain Porfirio Diaz, son of President Diaz, has taken the general contract for grading this line. It is to run from Merida, Mex., south through Peto and Bahia de la Ascencion to a point on the British Honduras line opposite Belice, with numerous branches to Valladolid and other points. Work is to be begun early this month. The lines will be narrow gage and include about 400 km. (249 miles). (Official.) The officers are given under Elections and Appointments. (Aug. 25, 1899, p. 604.)

SOUTHERN PACIFIC.—C. P. Huntington is reported to have announced to the Portland (Ore.) Board of Trade that a railroad will be built from Sheridan to run northwest about 35 miles to Tillamook, provided certain aids can be obtained.

SOUTHERN.—An officer writes that the company has under consideration the proposed extension from Maryville, Tenn., to run southeast to Gamble's Store, but decision as to building is not yet reached. (April 20, p. 264.)

Grading is reported begun on the proposed extension from Round Hill, west about five miles to Snickersville. (Jan. 19, p. 48.)

SOUTH ST. PAUL BELT.—Surveys have been made for the proposed extension of this line from South St. Paul north five miles to St. Paul. The engineer is at work on the estimated cost. (April 20, p. 264.) No building will be done before another year. (Official.)

SUPERIOR & ST. CROIX FALLS.—This company was incorporated in Wisconsin April 27, with a capital stock of $25,000, to build a railroad from Superior south 100 miles to St. Croix Falls. The incorporators are: L. J. Hunt, James A. Hile, R. I. Tipton, W. D. Dwyer and Frank A. Ross.

TENNESSEE ROADS.—Messrs. Shea Bros. & Co. of Knoxville, Tenn., are reported to have obtained a contract for the proposed line, near Ducktown, of the Tennessee Copper Co., of Copperhill, Polk Co., Tenn. It is to be about seven miles long, and includes a tunnel about a half mile in length.

THOUSAND ISLANDS.—The Dominion Railway Committee has granted a permit to this company to extend its line from the Grand Trunk into the mining region northeast. The road extends from the Grand Trunk south four miles to Gananoque, Que., and is owned by the Rathbun Lumber Co., of Deseronto.

TORONTO, LINDSAY & PEMBROKE.—The Ontario Government has granted a subsidy of $3,000 per mile for 36 miles from a point 15 miles northeast of Bancroft to a point at or near Golden Lake, on the Canada Atlantic. The road is to run from Bancroft, on the Irondale, Bancroft & Ottawa, northeast 51 miles to Golden Lake, and the Ontario Government has already given a similar subsidy for the first 15 miles. When the road is completed it will furnish a short route via the Irondale, Bancroft & Ottawa and the Pembroke Southern line of the Canada Atlantic to Pembroke. R. A. Campbell, M. P., Thomas Murray (Mayor) and A. Foster (President of the Board of Trade) are among the Pembroke men interested. Work is to be begun at once. The capital is said to be supplied by a New York syndicate.

UNION PACIFIC.—An officer confirms the statement that the company intends to double track its line from Cheyenne, Wyo., west 10 miles to Borie. The company will also build a new line between Buford and Laramie, Wyo., 30 miles, crossing the Rocky Mts. about a mile south of the present Sherman crossing and reducing the maximum grade for eastbound business to 43 ft. per mile. Kilpatrick Bros. & Collins are the contractors for all the grading. The company will do its own bridging. The work is extremely heavy, probably as heavy as any being done in the West. The maximum curvature is 4°. The contractors are about ready to begin work. (April 20, p. 264.)

VENICE TERMINAL.—This company was incorporated in Illinois April 26, with a capital stock of $100,000, to build a railroad from East St. Louis through Brooklyn, Venice, Granite City and Madison. The incorporators and directors are: D. R. Francis, Fred E. Allen and J. D. P. Francis, of St. Louis, and W. W. Kimbrough, E. W. Link, H. R. Allen and Joseph Roberts, of Venice.

WESTERN MARYLAND.—Work is begun on an additional mile of cut-off north of Quinsonia, Pa. (Aug. 25, 1899, p. 604.)

WEST VIRGINIA ROADS.—Estimates are being secured, according to report, for this proposed line between Fayette and Fayetteville, about five miles. It may be extended to the Loup Creek coal fields. A. D. Preston of Fayetteville is interested. (April 28, p. 280.)

WINNSBORO & CAMDEN.—Application is to be made to incorporate this company to build from Camden, S. C., on the Seaboard Air Line, west 35 miles to Winnsboro, on the Southern. Business men of Winnsboro are interested.

GENERAL RAILROAD NEWS.

ATLANTIC COAST LINE.—The consolidated company's plan provides for an issue of $20,000,000 of 5 per cent. preferred stock, $20,000,000 of common stock and $3,000,000 of certificates of indebtedness. There is outstanding to be exchanged $13,460,100 of stock of the subordinate companies. The A. C. L. of Virginia, $3,000,000, also the A. C. L. of South Carolina, $2,721,400, is to be exchanged at 150 new preferred and 150 new common; the Wilmington & Weldon, $3,000,000, at 200 new preferred and 200 common; the Norfolk & Carolina, $2,500,000, at 150 preferred and 50 common; the Southeastern of North Carolina, $350,000, will receive $167,000 in new 4 per cents., $50,000 in new preferred and $50,000 in new common; the A. C. L. of South Carolina 6 per cent. preferred $1,888,700 at 150. After these securities have been taken up there will remain in the treasury $1,617,900 of new preferred stock, and $4,117,900 of new common. (April 27, p. 280.)

CAROLINA & NORTHWESTERN.—The stockholders on April 24 approved the issue of new securities and the plan to change the road to standard gage and make an extension to connect with the East Tennessee & Western North Carolina line of the Virginia & Southwestern. The new syndicate has acquired nearly all of the $350,000 capital, and a majority of the $450,000 bonds, and proposes to issue $1,000,000 preferred and $1,000,000 common and to make a new mortgage for $1,320,000 to the Trust Company of America, trustee. (April 6, p. 228.)

CENTRAL OF NEW JERSEY.—The directors have formulated a plan for refunding the $11,500,000 consolidated 7 per cent. bonds of the Lehigh & Wilkesbarre Coal Co., due June 1.

CHICAGO & NORTHWESTERN.—At the annual meeting June 7 the stockholders will act upon the following propositions: To ratify the leases of the Boyer Valley and the Harlem & Kirkman pursuant to resolutions adopted by the directors Dec. 8, 1899; the purchase of the property of the Boyer Valley, the Harlan & Kirkman, the Minnesota & Iowa and the Iowa, Minnesota & Northwestern; purchase of the railroads and of some of the other property of the Winona & St. Peter, including the Dakota Central, the Mankato & New Ulm and the Minnesota & South Dakota. The stock of all these companies is owned by the C. & N. W.

CHOCTAW, OKLAHOMA & GULF.—The stockholders on June 27 will vote on a proposition to increase the capital stock, both preferred and common, to acquire the railroad and property of the Choctaw & Memphis, its leased line, to buy additional rolling stock and for other corporate purposes.

CINCINNATI, RICHMOND & MUNCIE.—The city of Richmond, Ind., has voted a subsidy of $150,000 to aid this company in its proposed line from a point on the Cincinnati, Hamilton & Dayton, to run northwest through Richmond to Muncie. (April 13, p. 245.)

CLEVELAND, AKRON & COLUMBUS.—The $730,000 equipment trust and second mortgage bonds of Aug. 1, 1890, have been called for payment Aug. 1 next, with interest to date, at Winslow Lanier & Co., 17 Nassau St., New York.

DETROIT & TOLEDO SHORE LINE.—Press reports state that Chas. N. Haskell has disposed of his holdings in this property. The company is successor to the Toledo & Ottawa Beach which is building a line from Toledo to Detroit. (June 16, p. 440.)

GULF & BRAZOS VALLEY.—Judge J. W. Patterson at Weatherford, Tex., has refused the application made for the appointment of a receiver for this property by persons who claimed liens against the company for labor performed and materials furnished, the aggregate amount being between $8,000 and $10,000. The refusal was made on the ground that the company did not appear to be insolvent or that there is any mismanagement of its affairs. The road is completed from Peck City to Mineral Wells, 10½ miles, and is being extended to Jacksboro. (April 20, p. 264.)

HOUSTON EAST & WEST TEXAS.—The Southern Pacific offers to guarantee by endorsement the payment of principal and interest of the bonds of this company in consideration of the right to redeem the same at 105 and interest at any interest period, upon six months' public notice. This agreement to guarantee is on condition that at least $2,000,000 be presented for stamping prior to June 1, and the guarantee holds only for the bonds presented. Bondholders are to deposit their bonds with Blair & Co., New York, and to pay $2.50 on each bond deposited. (April 13, p. 264.)

KANSAS CITY, PITTSBURGH & GULF.—The reorganization committee gives notice that substantially all the securities have been deposited under the modified plan of reorganization of Nov. 7, 1899. Further deposits will be received without penalty until June 2, after which the accounts of the committee will be closed and no further deposits can be received. (March 30, p. 210.)

LEBANON SPRINGS.—The Vermont section of this line, about six miles long, extending from the State line to Bennington, Vt., was sold at public auction April 25 to the Chatham & Lebanon Valley, which owns and operates the New York end of the road. The Vermont section has not been operated for several years but it is expected that trains will be running by July 1. It is understood that this road is to form a link between the New York & Harlem line of the New York Central and the Bennington & Rutland and the Rutland. (March 30, p. 210.)

MEXICAN NORTHERN.—The Morton Trust Co., New York, as trustees, has reserved $16,151 to buy first mortgage bonds of this railroad at 105 and accrued interest. Sealed proposals will be received up to noon, May 22, at the company's office. (May 12, 1899, p. 345.)

MISSOURI PACIFIC.—At a meeting of the Board of Directors, held at New York April 30, it was voted to authorize an issue of $15,000,000 5 per cent. debenture gold bonds. Of this issue $12,000,000 has been subscribed for at par and interest net by two stock holding interests. From the proceeds of this subscription $6,712,000 will be used to retire the outstanding M. P. 5 per cent. gold refunding notes authorized at the same meeting; $2,262,000 for retiring equipment notes; $1,065,000 for the payment of loans, and the remaining $1,761,000 for the reimbursement of income applied to capital expenditures and investments. The additional $3,000,000 not subscribed is to be reserved for betterments and improvements.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The minority stockholders have announced their intention to oppose the terms of exchange offered for their stock by the management of the Louisville & Nashville. (April 20, p. 264.)

NEW YORK & OTTAWA.—Judge Lacombe of the U. S. Circuit Court has appointed Henry W. Gays of 27 Pine St., New York, receiver for this company on application of Allanson T. Enos of Englewood, N. J. The company was incorporated in 1897 to build its line from Tupper Lake, N. Y., to the St. Lawrence River, 68.96 miles, and thence across the St. Lawrence and by its subordinate company, the Ottawa & New York, from the International boundary near Cornwall, Ont., to Ottawa. The road has been completed with the exception of the bridge which was destroyed by flood when nearing completion on Nov. 6, 1898.

In the Supreme Court at Saratoga, N. Y., April 27, a verdict of $10,000 was rendered in favor of John L. Henning for legal services rendered to the Northern New York, a subordinate company of the New York & Ottawa.

NORTHERN CENTRAL.—The $600,000 mortgage bonds of the Union RR. Co. of Baltimore, maturing May 1 with the coupon then due, are being paid by Alexander Brown & Co., Baltimore.

The State Treasurer of Maryland on April 27 refused to accept $1,500,000 in gold coin offered in full payment for the mortgage of the company made to the State in 1834 by the Baltimore & Susquehanna, which was later consolidated with the Northern Central. By the condition of the loan the company is obligated to pay 6 per cent., and desires to refund the loan at a lower rate. (June 10, 1898, p. 422.)

PENNSYLVANIA.—The various boards of directors of certain subsidiary lines have agreed to recommend to the stockholders of their companies the merging into the Schuylkill & Juniata line of the Pennsylvania. These roads with the proposed ratings of their shares are: Sunbury & Lewiston ($70); North & West Branch ($105); the Pennsylvania Schuylkill Valley ($41.54); the Sunbury, Hazleton & Wilkesbarre ($70); and the Nescopec ($40.42). (March 23, p. 194.)

PEORIA, DECATUR & EVANSVILLE.—An appeal is to be taken from the decision of Judge Allen in the U. S. District Court at Springfield, Ill., confirming the sale of this property to the representatives of the first mortgage bondholders. (April 27, p. 280.)

QUEBEC & SOUTHERN.—The Dominion Legislature has granted this company the privilege of taking over the United Counties RR. It was recently bought at sheriff's sale by Geo. C. Dessaulles of St. Hyacinth. The company will also build a line from Iberville, terminus of the United Counties, to run to the east bank of the Richelieu River opposite Lacolle, and thence through the counties of St. Johns, Napierville, La Prairie and Beauharnois to Valleyfield and thence across the St. Lawrence. The company is also granted the privilege of acquiring the franchises of the East Richelieu and branches, not to exceed 15 miles, and to enter into agreements with the Canada Atlantic, the Rutland & Noyan, the Rutland-Canadian and the Delaware & Hudson.

RIO GRANDE WESTERN.—At a special meeting of the stockholders, held April 30, it was decided to authorize the issue of $5,000,000 additional common stock for improvements. (March 30, p. 210.)

ST. PAUL & DULUTH.—Press reports from the West state that President Mellen of the Northern Pacific has admitted that negotiations are pending for the acquiring of the St. P. & D. by his company. (Jan. 26, p. 64.)

SEABOARD AIR LINE.—Pending the completion of the consolidation the company is issuing $3,400,000 loan certificates redeemable in two years or earlier, at the pleasure of the trustees. These are to take up loans by financial institutions and others. It is understood that a $10,000 loan certificate carries with it a bonus of 50 shares of preferred stock and 150 shares common of the S. A. L. (April 27, p. 280.)

TOLEDO, ST. LOUIS & KANSAS CITY.—Judge Allen in the U. S. Circuit Court at Springfield, Ill., on April 24 confirmed the foreclosure sale of this property. Confirmation has also been made in the State of Ohio. (April 20, p. 264.)

VICKSBURG, SHREVEPORT & PACIFIC.—Dr. J. H. McCormack of Monroe, La., has been appointed receiver of this property on petition of H. J. Hearns of Illinois. His claim was that the third mortgage bonds, of which he held $78,000, are in default, no interest having been paid thereon since 1889. (April 20, p. 264.)

WHEELING & LAKE ERIE.—The company has made a perpetual lease of its coal mining property to M. A. Hanna & Co.

WHEELING BRIDGE & TERMINAL.—The foreclosure sale under the first mortgage of 1889 is to take place at Wheeling, W. Va., May 22, the upset price being $750,000. (April 27, p. 280.)